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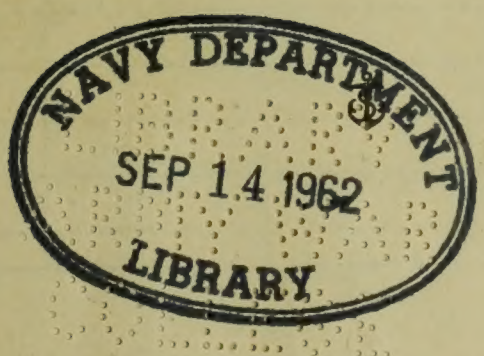

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The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

Supplement no.3- January, 1926

Michelsen, Andreas- The submarine warfare,1914-1918

separate copies also filed in D 591 M62

Supplement no.4- February, 1926

Groos, O. - The German official account of the sea battle off the Skagerrak (Jutland)

separates copies filed in D 580 K 92-e v.1-pt.5

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O. N. I. MONTHLY INFORMATION BULLETIN

VOL. VIII JANUARY, 1926 No. 7

ARGENTINA

NAVAL AVIATION

November, 1925

[Source reliable]

The naval aviation at present has charge of the development of the schools of aeronautics and the aerial defense of the maritime frontier.

There are at present two schools and there are three naval air stations under construction—Punta Indio, Mar del Plata, and Puerto Belgrano—and Comodoro Rivadavia is being studied.

Reforms are being studied to be introduced in accordance with acquired experience into the existing regulations of naval aeronautics.

With respect to civil aviation, there is a bill before Congress creating a dirección general de aeronáutico, a branch of the Ministry of War, and composed of a superior officer of the army as director general and four delegates from the Ministry of the Interior, War, Navy, and Public Works, with the following powers:

(*a*) To take all measures tending toward compliance and enforcement of the law.

(*b*) To promote the development of civil aeronautics, taking charge of the administration of funds which may be applied for that purpose.

(*c*) To cooperate in the coordination between civil aeronautics and that of the State in connection with the national defense.

(*d*) To propose to the executive power aerial routes.

(*e*) To formulate and propose to the executive power regulations and changes in rules relative to the construction of airplanes, airdromes, and the development of the aeronautic service.

(*f*) To make the registers, certificates, diplomas, authorizations, etc., relative to the personnel and material of the civil aeronautics

(*g*) To determine the registration marks to be carried by the airplanes.

(*h*) To dictate all reports of aerial services presented to the public powers.

(*i*) To watch that every individual belonging to the civil aerial navigation be graduated and provided with a "cedula" of personal identification and the corresponding permission, which can be withdrawn by resolution of the dirección general de aeronáutico in case of misconduct, physical incapacity, public crimes, or infractions stipulated by the regulations of aero navigation and especially for causes which affect the safety of the nation, the apparatus, passengers, cargo, or mail.

(*j*) To take a census of the airplanes, airdromes, graduated personnel, and in general of all that directly or indirectly may be useful to the functioning and development of aeronautics.

(*k*) To approve and set the rates for public services.

(*l*) To set the fines referred to in article 52 of the present law.

(*m*) To inspect, when they deem it convenient, through the agents to be determined upon, aeronautic constructions, airdromes, and appliances, and to demand the presentation of the diplomas, certificates, and other documents relative to aeronautics referred to in this law and the regulations in effect.

NAVAL AERONAUTIC SERVICE

It has under its charge the organization, inspection, and utilization of the air service of the navy, such as the supervision of aeronaval civil maritime activities, with an end to the enforcement of the laws, rules, regulations, and orders of national or international character.

It has under its direct dependence the schools of aviation and aerostatics.

It has charge of the studies, information, etc., referring to aeronaval service.

It determines the appointment and transferring of superior and noncommissioned personnel forming part of the aeronautic service to the schools, bases, coastal naval air stations, and ships of the fleet.

It plans the establishment and organization of the aeronaval services for better efficiency in times of peace as well as of war, and to this end will present the corresponding studies.

It supervises and will present the necessary projects for stationary constructions in the schools, bases, and aeronaval stations, as well as in the corresponding installations in the ships of the fleet.

It intervenes in the acquisition of sheds and workshops and all other construction of the same kind for the aeronautic service.

It proposes the acquisition of flying material as much for instruction as for war and determines the acquisition of aeronautical material pertaining thereto.

It frequently inspects the aerostatic schools, the aviation material of the bases and the naval airdromes, and the ships of the fleet, reporting the result.

It presents modifications to be introduced in the regulations and instruction programs in force for the superior and noncommissioned personnel.

It keeps itself informed about the state of preservation of the aeronautic material and determines what is necessary in order to maintain it in efficient condition.

It determines the technical changes which should be made in the existing material and proposes tests.

It proposes the aeronaval exercises that should be done to develop the naval service in connection with the ships of the fleet, in accordance with the dictates of the general staff.

It anticipates the enlargement of the civil aeronaval navigation and its possible utilization for war purposes.

It grants concessions and permits to establish aeronaval communication lines which shall be allowed to private enterprises.

The naval aeronautic service shall be constituted of a dispatch office, correspondence office, and files, and the following sections: The personnel and services; the material and inspection.

DISPATCH, CORRESPONDENCE, AND FILES

This office will be under the direction of the chief of the service.

It transmits all the orders, decrees, communications, and other official matter, classifying and distributing it to the sections to which it corresponds, keeping the necessary records.

SECTION A, PERSONNEL AND SERVICES

It keeps up to date all data concerning the superior and noncommissioned personnel belonging to the aeronautic service, including appointments and transfers of said personnel, according to the necessities of the service.

It plans the programs of instruction for the special schools taking into account the program of arms.

It follows the program of similar schools in foreign countries and adopts any modification tending toward the better instruction of the personnel.

It classifies, registers, and has custody of the special documents which, because of their nature, should not be filed.

It has custody of the reserved books and documents, as well as the correspondence of the same character.

It is charged with the general file and library.

It proposes regulations for the bases, coastal stations, and ships.

It compiles and studies maneuvers made during the year by the aeronautic service, with the object of better utilization of arms in

the coming maneuvers, especially those connected with ships of the fleet.

It prepares the descriptive manuals of material and reserves corresponding to the aeronautic service in case of war, in accordance with orders received.

It follows carefully the development of aeronautic service in so far as it concerns the Ministry of Marine and studies the most efficacious measures for its increase and utilization in case of war.

It compiles in advance all necessary data for the preparation of the "Proyecto de Presupuesto" (budget estimate) and the "Memori' a Annual" (yearbook) corresponding to the various divisions of the aeronaval service.

SECTION B, MATERIAL AND INSPECTION

It studies that which refers to the stationary constructions pertaining to the school, bases, and aeronautic stations requiring the collaboration of the authorities of said divisions.

It compiles data about sheds, workshops, and similar constructions.

It prepares technical information about construction repairs or changes of the flying apparatus.

It determines the acquisition of naval planes and material pertaining thereto, for which purpose it will collect and catalogue the necessary data.

It will formulate the specifications and conditions governing the use of the material in construction, repairs, or changes in this country or in a foreign land, including corresponding programs of reception.

It proposes the rules for use and conservation of the flying material.

It has charge of the inventories of the aeronautic material and the file of plans.

Improving Mar del Plata Port

Since the port of Mar del Plata was made sufficiently deep to permit the entrance of H. M. S. *Repulse* during the recent visit of the Prince of Wales, the authorities have taken the matter in hand of drawing up a plan for the all-round widening, deepening, and improvement of the port named, so that it may be considered in the future as a permanent port of entrance for large ocean-going steamers.

It is even rumored that a certain shipping company has promised to establish a line of steamers between Mar del Plata and Europe, if the entrance channel be made of sufficient depth and is provided

with the necessary facilities, as this would cut the journey to Europe from Argentina by a day and a half.

BRAZIL

FLEET MANEUVERS

On September 10 the Brazilian fleet, consisting of battleships *Minas Geraes* and *Sáo Paulo*, cruisers *Floriano*, *Barroso*, *Maranháo*, *Alagoas*, *Amazonas*, *Piauhy*, *Rio Grande do Norte*, *Sergipe*, and *Matto Grosso*, tender *Belmonte*, and tug *Heitor Perdigáo*, left Rio de Janeiro (Guanabara Bay) for its annual maneuvers, under command of Rear Admiral Penido.

The squadron made a brief shakedown cruise, maneuvering the better part of the first day in waters adjacent to Rio de Janeiro. It then proceeded north, anchoring the second night at Cape Frio. These first two days the sea was rough and the *Floriano* was unable to keep up. The cruise, however, was without incident, except that one destroyer division lost touch for several hours during the night.

On Saturday, September 12, the squadron left Cape Frio early in the morning, making a few maneuvers during the forenoon, then proceeding to Ilha Granda.

The squadron anchored at Ilha Granda on Sunday morning, September 13, and for the following 20 days the fleet got under way every morning for various maneuvers, such as sight setting, ranging, fire-control drills, torpedo defense, etc. All the squadron participated in these maneuvers with the exception of the first three days, during which the *Sáo Paulo* remained at anchor for engine adjustments. The maneuvers were carried on without incident, except one destroyer had trouble with her condensers and another destroyer trouble with her reversing engines.

On October 2 the fleet sailed from Ilha Granda for Santos. It remained there six days. During this time oil, coal, etc., were taken aboard and liberty given the crew, those members of the crew having homes in the State of Sáo Paulo being given three to four days liberty. During its visit to Santos the future President of Brazil, Señor Washington Luis, visited the flagship.

Leaving Santos, the squadron sailed for Sáo Sebastiáo October 8-9. During the forenoon of October 9 a war game was begun at 5 a. m., the squadron being divided into two fleets—the *Minas*, *Floriano*, and three other destroyers being under the command of the commanding officer of the *Minas*, Captain Noronha, and the rest of the fleet under the command of Captain Damion da Silva, of the *Sáo Paulo*. Each chose staffs the night before. This exercise was a combined scouting and tactical problem. This occupied

practically all day. While not very brilliant in its execution, much experience was gained. The counterattack of Captain Damion's destroyers was not made. The scouting part of the problem was very well conducted. The engagement of the main body with the major guns by Captain Damion's force was very well done. Captain Noronha made the mistake of countermarching under fire without the cover of smoke screen.

During the stay of the fleet at Ilha Granda the destroyer tender *Belmonte* served successfully as a collier and supply ship; aerial mail service also was conducted from the island to the arsenal at Rio de Janeiro.

It is understood that the maneuvers this year by the Brazilian squadron were the most successful ever accomplished and much valuable experience was gained by the entire personnel of the fleet.

CHINA

IMPORTS OF MUNITIONS INTO MANCHURIA

October, 1925

It is reliably reported that the German steamship *S. S. George* arrived at Newchwang from Vladivostok, carrying 1,700 tons of munitions and 7,500 packages of rifles and ammunition. It appears that the cargo was originally consigned to Vladivostok from Germany. It was further reported that another ship was expected at Newchwang within a week or 10 days with a cargo of dynamite.

There is no information regarding the name of the consignee in Manchuria, but it is evident that the shipments are for the use of the local Government. These reports, taken in conjunction with imports during the early part of May, 1925, indicate that there is still a steady influx of munitions into Manchuria.

Political notes

[Source, M. I. D.]

In Manchuria, General Chang Tso-lin again placed himself in undisputed control over all of Manchuria by completely overwhelming the rebel forces under General Kuo Sung-lin at Sinminfu.

In Chihli Province, General Feng Yu-hsiang, by defeating General Li Ching-lin, gained Tientsin and extended his control over the Peking-Mukden Railway as far as Shanhaikwan. General Li's forces retreated southward toward Tsinanfu. This victory places Feng in control of all of Chihli Province and provides him and his supporters, the Soviets, with the ice-free port of Tientsin.

This situation leaves Feng between two enemies, Chang on the north and Li on the south. However, there is no anticipation of an

aggressive movement on the part of Feng's enemies before early spring.

During the recent encounters near Tientsin, there was much disorder and some looting in the native city but the foreign concessions were not disturbed. For one week the contending forces did not permit the International train to run between Peking and Shanhaikwan. As there was no antiforeign feeling in evidence, it was thought inadvisable to use force in keeping the railway open.

It is understood that the Japanese reenforcements in Manchuria have been largely withdrawn.

A new Premier, Hsu Shih-ying, has been named. Mr. Hsu has had many years of experience with the police and judiciary. He has apparently been selected to steer China through the conference on extraterritoriality, which opens on January 8 at Peking.

A new cabinet has been formed in which friends of Feng have the finance and war portfolios; a friend of Tuan Chi-jui has communications; a Chihli Party man has the navy; and Kuomintang supporters the other five.

It is reported that the plan of the leaders is for Tuan Chi-jui to resign, leaving the cabinet to govern, and the cabinet upon assuming office to call upon each province to draft and adopt a constitution for its own government and thereafter to send representatives to Peking for the purpose of adopting a national constitution, forming a confederation of self-governing provinces.

General Feng has announced his resignation from all his official posts and his determination to live in retirement. As he has made this statement before, it is not yet taken seriously.

"China is now divided into four fairly well defined politico-military zones, Kuomintang in the south, Chihli Party in the Yangtze Valley, National Army in the north, and Fengtien Party in Manchuria."

Reliable information states that the assassination of General Hsu Shu-cheng (Little Hsu) was ordered by General Feng. General Hsu with a large staff recently completed a tour of Europe and the United States.

DENMARK

MANUFACTURE OF AIRCRAFT

The only private concern manufacturing aircraft in Denmark is the Rohrbach Metal Airplane Co., A/S, Ørosundavej 12, Copenhagen, organized as a Danish limited company in 1922 with a capital of 500,000 crowns, controlled by the German firm of the same name.

During 1924 the local plant completed two machines, and it is stated that up to June 1 of the current year four machines would

have been ready but for the recent labor troubles. The yearly capacity of the plant can therefore be put at between eight and nine airplanes.

The machines thus far completed have been for a Japanese firm, Mitsubishi Shoje Kaisha (Ltd.). They are duralumin monoplanes, weighing 3,300 kilograms, and measuring 29 meters from tip to tip. Each plane is equipped with two 360-horsepower Rolls-Royce "Eagle 9" motors. The Rohrbach factory is in position to turn out machines of other types and to install such engine equipment as may be desired. At the present time between 110 and 120 workers are employed at the plant.

This concern has recently acquired considerable area in close proximity to the Government air harbor at Kastrup, and it is planned to erect a factory on this site within the course of a year or two. At the present time the Rohrbach Co. has a hangar and testing facilities at the Kastrup air harbor.

The Danish Navy has for some time been manufacturing hydroplanes as well as motors and accessories. Up to the present time nine seaplanes, entirely of Danish manufacture, inclusive of motor, have been completed.

At the shops of the Danish Army some manufacture of accessories and parts takes place. The machines now in use in Denmark have been imported from Holland and Germany. Most of the motors installed on these airplanes are of British manufacture. Parts and accessories, not being manufactured to any great extent in Denmark, are imported chiefly from the countries supplying the machines.

Danish imports of airplanes amounted to eight in 1923 and four in 1924.

As both Danish commercial aviation concerns work in collaboration with continental manufactures of airplanes—Det Danake Luftfartsselskab with the Fokker Co. and the Dornier Works and Dansk Lufttransport A/S with the "Junkerwerke"—it does not appear that any sales possibilities exist at the present time for American-built commercial aircraft. As an illustration of the trend, it may be mentioned that the French Farman concern recently offered a large commercial machine at a very moderate price to the Danish concerns with the object of introducing these aircraft on the routes now operating. This attempt, however, met with no success. For the sake of economy, and also because their pilots and mechanics are familiar with the machines now in use, the Danish concerns, if for no other reasons than these, will naturally continue to buy aircraft of types similar to those now in use. For the present season, however, no further purchases will be made.

FRANCE

MOVEMENTS OF MEDITERRANEAN SQUADRON

December 1, 1925

[From a consular report]

The French Mediterranean squadron, based upon Toulon, is effecting a practice cruise November 24 to November 29, 1925. The squadron consists of the cruisers *Bretagne* (flagship replacing the *Provence*), *Paris*, *Courbet*, and *Jean Bart*, and the destroyers *Senes*, *Commandant Bory*, *Mangini*, *Enseigne Roux*, and *Matelot-Leblanc*. Clearing from Toulon at 9 a. m. on November 24, it is visiting various anchorages along the coast in the vicinity of Marseille and as far west as the Gulf of Fos. The cruiser *Metz*, properly part of the squadron, is said to be in use in connection with the Riff campaign in Morocco.

During the week November 30 to December 6 the squadron will remain at Toulon. On December 8 it will cruise eastward, with an anchorage in the Gulf of Juan. When it returns to Toulon on December 18 it will remain inactive until mid-January and a considerable number of shore leaves will be granted to officers and men.

The new commander in chief of the squadron, Vice Admiral Violette, who assumed his functions on October 1, promptly ordered his vessels out for maneuvers off Hyeres during the week October 7 to October 14 and thence took it to the Gulf of Juan for a week's training work. At that time the destroyers *Protet*, *Boucher*, and *Lucas*, as well as several submarines, were present. It is said that Admiral Violette felt that the protracted rest period enjoyed by the fleet throughout the summer, following its June–July cruise, rendered an immediate resumption of activity advisable. His abruptness and energy in this regard seem not to have been wholly appreciated. The merchants of Toulon, who apparently feel that they have a vested right to the fleet's presence at all times, appear actually to have been resentful. It was conjectured that the presence of the fleet in the Gulf of Juan was synchronized with the holding of the Socialist Party's national political convention at Nice in order that some of the leading politicians then in power might be induced to visit the ships and intensify their interest in naval matters. The Minister of Marine, M. Emile Borel, did stop off at Toulon on October 19 to visit Vice Admiral Fatou, who commands all naval forces in the south of France, and a parliamentary delegation which accompanied the minister remained at Toulon and was taken by the destroyer *Admiral Senes* to visit the squadron in the Gulf of Juan. The cruiser *Strasbourg* appears to

have remained inactive at Toulon (without being reabsorbed in the squadron) since its return from the Riff coast.

NAVAL ACCIDENTS

The fact that the English and American Navies are not the sole sufferers from naval accidents has been forcibly demonstrated by the succession of misfortunes in this region within the past three weeks.

In the early morning hours of November 13 the submarine *Nereide*, anchored in the Missiessy basin of the Toulon Navy Yard, was set on fire by an explosion of hydrogen in connection with the recharging of her batteries. Despite all efforts the vessel was completely gutted by fire, two electricians being killed. The submarine was finally towed into No. 2 Castigneau dry dock and submerged. An investigation indicated that the forced ventilation system for keeping the charging chamber free of escaping gases may have functioned improperly. The dead sailors were buried with full naval honors, a funeral address being delivered by Admiral Fatou.

On November 18 at 9.30 p. m. a fire broke out in the foundry of the Toulon Navy Yard and was carried by the northeast wind into the heart of the very extensive plant. The machine shops, containing many new electric installations, were destroyed and the adjusting shops and repair shops were very severely damaged. The loss will run into many millions of francs and naval construction repair work for the vessels of the Mediterranean fleet will be gravely hampered for months if not years to come. The fire is thought to have originated from a short circuit. It appears, however, that the night-watch service had been recently reduced and sinister suspicions have been suggested.

NAVAL AVIATION

A small naval hydroplane center at La Plage d'Hyeres, 13 miles east of Toulon, is being enlarged and a dirigible hangar is being constructed. This field will serve as an intermediate point between Toulon and the naval aviation center at San Raphael, and will be especially convenient for hydroplane evolutions in conjunction with the frequent naval maneuvers off the Salins d'Hyeres, where two training ships (the *Patrie* and the *Marseillaise*) are always stationed. It will also be of service to the dirigibles now kept at Pierrefeu, 13 miles inland, up the valleys of the Gapeau and Real-Martin Creeks (where the *Dixmude* was garaged). The Pierrefeu station has been somewhat handicapped by its lack of a shore post. The newly enlarged station at the Plage d'Hyeres was officially inspected on

October 19 by the Minister of Marine in connection with his visit to Toulon mentioned above.

The naval aviation center at Istres, on the Lake de Berre, 23 miles northwest of Marseille, is always active. On October 18 the speed contest for the Beaumont cup was won by Sadi-Lecointe, with an average of 312.5 kilometers per hour, a slight improvement over his last year's record.

The results of the elaborate four-day hydroplane competitions held at the San Raphael naval aviation center in September have presumably been reported through the usual channels. It will be recalled that two aviators were lost.

On November 17 a hydroplane from the San Raphael center en route to participate in a practice attack by several groups of machines against the Mediterranean squadron was forced to descend in a rough sea. The pilot and two wireless operators lost their lives, the mechanician alone being saved. The hydroplane was the *Blanchard No. 7*, of the escadrille 5–R–1, and the accident occurred between Cap Dardier and Cavalaire.

FRANCE

RECENT LAUNCHINGS AND TRIALS

Submarines

On November 18, 1925, the submarine *Morse* (walrus) was launched at the naval arsenal at Cherbourg in the presence of the vice admiral commanding and the entire naval personnel.

This vessel is the fourth unit launched at Cherbourg of six submarines of the first class authorized by act of the French Parliament April 18, 1922. The act contemplated the completion of the six by July, 1925, but this aim was not achieved.

Four were to be built by the naval arsenal at Cherbourg, one each by the arsenals at Brest and Toulon. Of the Cherbourg allotment the *Requin* (shark) was the first to be launched, on July 18, 1922, followed by the *Souffleur* (blowfish) on October 1, 1924, the *Narval* (narwhal) on May 9, 1925, and now the *Morse* completes the four.

The principal characteristics of these submarines are as follows: Displacement, 1,137 tons on the surface, 1,410 tons submerged; length, 85 meters (276 feet); width, 7 meters (22¾ feet); draft, 5 meters (16¼ feet). Two Diesel engines of 1,450 horsepower provide power for surface cruising, and two electric motors developing 800 horsepower each drive the vessel when submerged. The surface speed is 16 knots; the submerged speed, 9 knots. Cruising

radius, 7,000 miles at 9 knots on the surface, and 105 miles at 5 knots submerged. Armament: 8 torpedo tubes of 550 millimeters (21.7-inch) one gun of 100 millimeters; 16 torpedos carried. Crew: 4 officers and 44 enlisted men.

According to the Raiberti program of naval construction put through in 1923, nine submarines, two of which were to be mine layers, were to be constructed in each year from 1925 to 1928. The French Ministry of Marine, however, has just announced that the Government now proposes to distribute its annual schedule of naval construction over an 18 months' period, so that the new naval vessels due for completion at the close of 1926 will not be finished until the close of 1927, amounting to a 33 per cent decrease in the naval construction program for 1925–1927.

Cruiser

The cruiser *Duquesne*, first of the two 10,000-ton cruisers built under the 1924 French naval program, was launched at Brest, December 17. The vessel is 607 feet long, will carry 600 men, and have a main armament of 8-inch new model guns. The gun shields will be practically her only armor.

Destroyer leader

The destroyer leader *Tigre*, first unit of this class completed, has recently completed her official trial runs.

The *Tigre* is equipped with Rateau turbines, 55,000 horsepower.

From all accounts, the official trial tests of the *Tigre* gave remarkable results. The average speed during a continuous period of eight hours, over a measured mile, was 35.93 knots per hour; during the ninth hour of the run the *Tigre* attained an average speed of 36.70 (58,000 horsepower). The consumption of fuel was 10 per cent less than called for, while the speed attained was 10 per cent greater than the contract guaranty. A speed of 18 knots was obtained with cruising turbines with a very reduced consumption of fuel oil—141 kilos per mile.

GERMANY

ACTIVITIES AT WILHELMSHAVEN

November, 1925

The shops at the German naval dockyard at Wilhelmshaven all have a very busy appearance, and it was stated that at present 4,000 men are employed. The machinery of the shops appears to be in

LIBRARY NAVY DEPT

very good condition and that in the machine shop looks especially new.

They are occupied principally with the completion of the cruiser *Emden*, construction of four destroyers, the manufacture of boilers for the destroyers under construction, overhaul and repair of the various ships now at the yard, as well as various manufacturing and repair work. On the building ways the destroyer *A* is under construction, but not yet launched. This vessel has 800 tons displacement and is expected to be completed the end of May, 1926. Also saw three new destroyers which have just been laid down. They are all of the same tonnage and design as the destroyer *A*. The new cruiser has not yet been laid down. It is stated that she is to be a sister ship of the *Emden*. In the boiler shops they are building the boilers for the new destroyers. They are special marine-type oil burners. Four are practically completed, one is completed and being tested, and three others have been commenced. Each destroyer will be fitted with five such boilers.

The yard has three large dry docks, 200 meters in length by 30 meters width across the entrance, probably dating from just before the war. In addition there are four smaller dry docks (old). Larger ships are docked on the floating docks of the Deutsche Werft A. G., which adjoins the dock yard.

The battleship *Schlesien* (out of commission) is being entirely modernized. The battleship *Schleswig-Holstein* is being reconditioned and is expected to replace one of the battleships now in commission in a few months. This vessel has been fitted with a new type fire-control mast, which is also installed on the cruiser *Emden*. Other vessels in commission at the yard for overhaul are the *Braunschweig*, flagship of the commander in chief of the fleet; the *Hannover*, also a flagship; the cruiser *Hamburg*, fitting out for a long cruise which will probably take her around the world; and the fishery steamer *Ziethen*.

The *Hamburg* is at present in dry dock and her propeller shafts have been taken out. While in dry dock the crew of the ship is housed on an old cruiser moored at the entrance of the dry dock, within very convenient distance for the crew to go back and forth during working hours and watch duty on board.

Other vessels laid up in reserve at the yard are the former battleship *Preussen*, fitted out as a mother ship for mine sweepers, a very large number of mine sweepers, and the cruiser *Arcona*.

Among the various manufacturing and repair jobs going on were manufacture of metal furniture for new ships, overhauling fire-control gear, overhauling navigational gear, overhauling radio outfits, and overhauling several Parsons turbines of torpedo craft. In the gun shops there were three 12-inch guns and mounts belonging

to the coast defenses at Wangeroog, at the entrance of the Jade, and being overhauled. A number of reserve guns of large caliber were also at the yard, probably a dozen.

The system of locks and harbor were also seen. The largest and newest entrance lock is 240 meters long by 40 meters in width. The middle entrance is no longer used and is filling up. The nonuse is due to its bad location for handling ships with reference to the current. The third entrance is a small one and is used for small ships only. The harbor is absolutely deserted. It was intended to use it as a commercial harbor, but there is nothing to cause ships to go there, as Wilhelmshaven is essentially a dock yard town, depending entirely upon naval activities.

The works of the Deutsche Werft A. G. are entirely closed down. On the water front of these works there are now 9 floating docks—4 large, 4 medium sized, and 1 small one.

GERMANY

NOTES ON CRUISER "EMDEN"

December, 1925

The *Emden* is at present at the dockyard, Wilhelmshaven, being completed. There are still a large number of workmen on the ship completing final odds and ends. The ship was expected to leave for preliminary and standardization trials about the end of this month. After the completion of these trials, the ship will return to get ready for final trial runs. The sketches are taken from the "Marine Rundschau" and show the present battery arrangement (fig. 1) and the final battery arrangement (fig. 2). The eventual battery arrangement calls for eight 15-centimeter guns set up in twin mountings on the fore and aft center line of the ship, as shown in the sketches. On account of some difficulties with the control commission, new guns and mountings have not yet been manufactured and it is not known when they will be completed. The temporary installation consists of old type 15-centimeter guns dating from about 1914, mounted as follows: Four in the fore and aft center line in single mounts, as shown; two on each side of the forecastle deck abreast the bridge; and two on the main deck aft in place of torpedo tubes. At present only two of these twin torpedo tubes are in place, the forward one as shown; the after one will be put in place when the guns that are there at present are taken out. On the center line aft there are also two 8.8-centimeter guns for antiaircraft protection.

The bridge is very small and has only a narrow wing platform on each side leading to the sides of the ship. These wing platforms

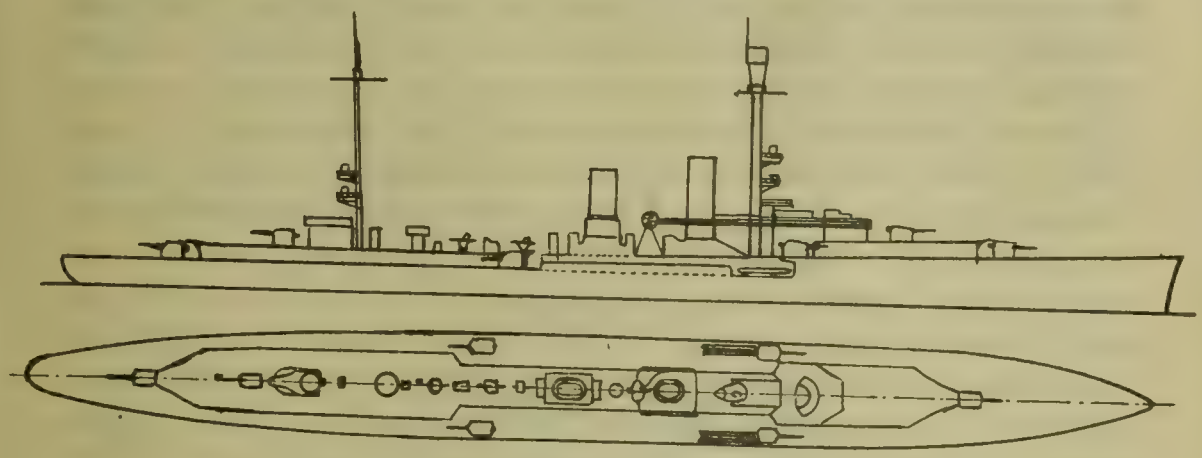

FIG. 1. TEMPORARY ARMAMENT.

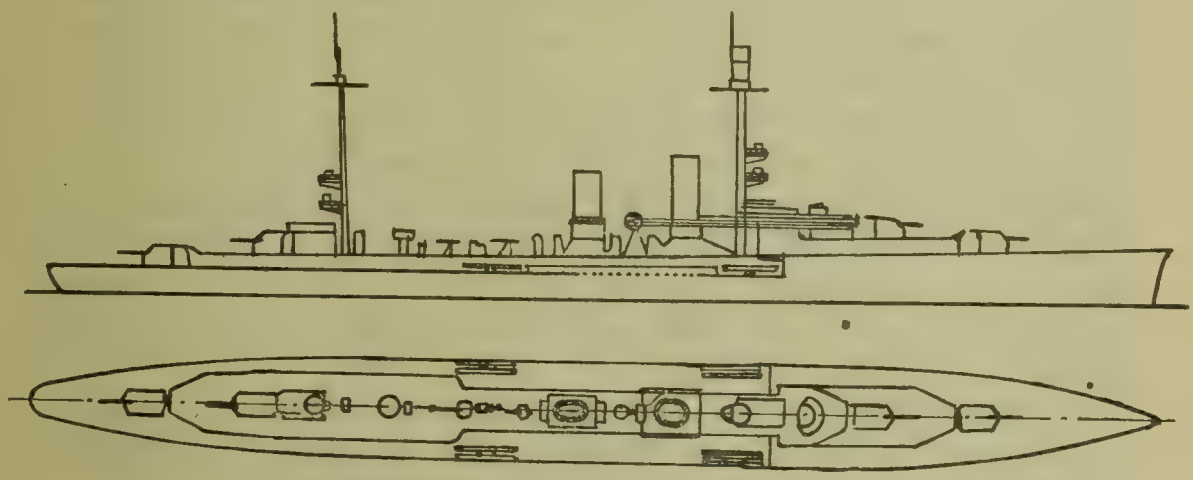

FIG. 2. FINAL ARMAMENT.

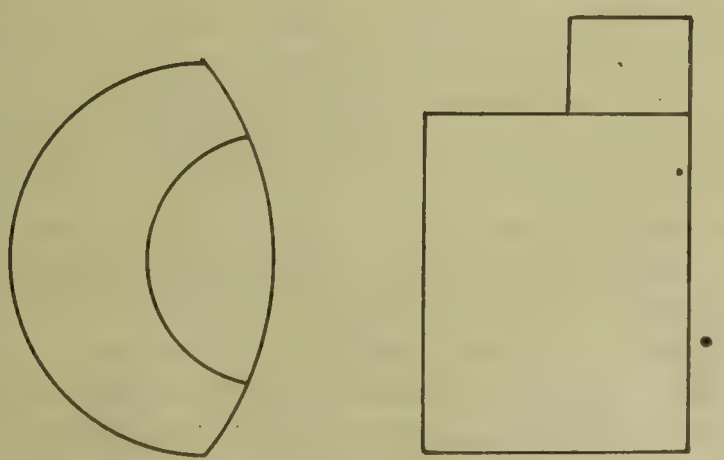

FIG. 3. CONNING TOWER.

are badly located, being too far aft from the steering wheel. At the forward end of the bridge there is a small steering wheel and in front of this a magnetic compass and a gyro-compass repeater. The conning tower is directly abaft of this steering station and the engine telegraphs are inside the conning tower. The conning tower (Fig. 3) is a double-story tower: the after side of the tower is about 3 inches thick; the thickness of the forward part could not be seen. The upper part of the conning tower is the fire-control station. On top of this is a small range finder which, it was stated, will be replaced later by one of larger size. A short distance abaft the conning tower is a deck house containing chart house and navigator's workroom and emergency cabin for the commanding officer. On the top of this deck house is another range finder which seemed to be about 15 feet long. The foremast is directly aft of this deck house and is a new type of fire-control mast. It is a hollow circular steel mast and at the top flares out, as shown in the figure. The conning tower is nearly flat on the after side and circular on the forward side. The ship has a high raised forecastle cut away at about abreast of the bridge to the main deck. There is, however, a superstructure running aft from the break of the forecastle, but which does not run all the way aft on this deck, being cut off some distance from the stern. Abaft the superstructure on the main deck is a 15-centimeter gun position and on the after part of the superstructure deck is another 15-centimeter gun position.

The captain's quarters are located in the after part of the superstructure and the officers are quartered just forward. Four watch officers and the navigator have rooms in the forward part of the ship. The complement of the ship consists of 21 commissioned officers, 21 warrant officers, and 450 crew. Only half of the crew are on board at present.

The ammunition is supplied to the guns by means of portable overhead electric motors running a whip. There are three such overhead motors at each ammunition supply station and they can be easily transported from one station to another or taken off and replaced by spares.

There was no radio in place nor were there any boats on board.

In an article in Schiffbau, it is said that a special boat-stowage place is provided in the deck house.

There are two smokestacks, the forward one circular and the after one elliptical. Viewed from abeam, they present a similar appearance of size, as the fore-and-aft axis of the second is the same as the diameter of the forward stack; the minor axis is smaller and the stack is also somewhat shorter.

Other details: Normal displacement, 6,000 metric tons; length, water line, 493¾ feet; over all, 508½ feet; beam, 47¾ feet; draft

(mean), 17½ feet; guns, ten 5.9-inch, all on center line; three 22-pounder A. A.; torpedo tubes, four 23.6 inch twin deck mountings; geared turbines; marine type Schulz-Thornycroft boilers, two-thirds oil, one-third coal fired; designed horse power, 45,000=29 knots; fuel, 1,118 tons coal+800 tons oil; effective cruising radius, 6,500 miles; designed for foreign service, particular attention being paid to accommodating personnel.

GERMANY

PLANT OF THE AKKUMULATOREN FABRIK A. G., HAGEN, WESTPHALIA

November, 1925

This firm manufactures storage batteries of all sizes, from that of a pocket lamp to the storage batteries employed in locomotives and electrical establishments. At present their factory employs a force of 2,200 men and 300 officials, but have facilities for employing a total of 3,500. The firm is the largest storage-battery manufacturer in Germany, having another plant at Berlin, and the head offices are also situated in Berlin. At the Berlin plant they manufacture mostly the Varta battery for automobiles. They have branches in different parts of the world and also connections with foreign firms manufacturing the same battery and to whom they furnish all their latest developments by special agreement. In the United States, for instance, the Electric Storage Battery Co., of Philadelphia, which manufactures the same type, has such an agreement, and during the summer Mr. Lloyd, the president of this company, was over here and inspected the plant and consulted with the officials of the company here. Mr. Gould, of the Gould Storage Battery Co., also visited the plant at Hagen and consulted with the officials there.

Before the war and during the war this plant was largely employed in the manufacture of storage batteries for German submarines, but at present this type of battery is no longer manufactured here. It is stated that they have no orders whatever for the manufacture of storage batteries for German or any other submarines; that the plant is periodically inspected by the Inter-allied Control Commission, and that for that reason they would not accept any such orders. I was informed, however, that last year one of the officials of the company visited the Accumulateur Tudor Cie. at Lille, France, and there saw some submarine storage batteries under construction which they informed him were for Japanese submarines.

At the present time the factory appears to have a large order for miners' safety lamps, and they are also manufacturing a number of batteries for electric locomotives, electric cranes, and storage plants of electric-light concerns.

As mentioned above, the Electric Storage Battery Co. of Philadelphia receives the benefits of all the latest developments in the battery types of this company.

GERMANY

MISCELLANEOUS NOTES

Report of an interview with Dr. Louis Brandt regarding his method of preparing and loading the explosive charge of the war head of torpedoes

Dr. Louis Brandt was interviewed in Bremen recently with regard to a reported new type of torpedo with which he is supposed to be familiar. It was found that it was not at all a question of a new type torpedo, but a new method of preparing and loading the explosive charge of the war head, by which an increase of 30 per cent density is obtained, and in consequence has greater explosive effect. The new method of loading can be applied to any type or size of torpedo, and can of course be similarly used for mines and airplane bombs.

Doctor Brandt is a chemist and is at present associated with the firm of Doctor Weiss and Doctor Labaud, Ansgarikirchhof 6, Bremen, conducting a chemical laboratory at that address. During the World War he served as a chemist in the navy and was employed in the manufacture and chemical testing of explosives, particularly explosive charges for torpedoes of submarines. It was while so employed that he developed his new method of loading war-head charges. His method was adopted toward the end of the war, and he prepared about 40 such charges, which were loaded into war heads of torpedoes then in use. Only one was actually fired in action. He did not personally witness any tests or explosions, but states that he was informed by navy officials that an increase of about 30 per cent in explosive effect was obtained. He is the only one that knows the secret of his new method and he is willing to sell his idea to the American Government, but is not at all clear in his mind about the sum for which he will sell. The method is not patented.

In addition to the foregoing Doctor Brandt has invented a method of making fuel oil heavier than water, and thereby making

it safer in case of fire or if an oil compartment should be pierced. In case of fire it can be covered with water, and if a compartment is pierced the oil will sink instead of rising to the surface. One of the results of the latter would be that a submarine's position under water is not betrayed by an oil slick on the surface, as frequently happened during the war. The result is accomplished by the addition of certain chemicals which he claims can be done to any desired quantities of oil, and that it can be accomplished sufficiently easy to make it a practical commercial proposition. This idea he is also willing to sell to the United States Government. He would like very much to go to the United States to demonstrate his inventions, provided, of course, that his expenses are paid.

German-French air route

The Frankfurter Zeitung of December 1 holds out the hope that a Berlin-Paris air service will soon materialize. According to this journal, the negotiations now being conducted in Paris concerning a German-French air service are progressing. It is understood that France is willing to permit German planes to fly over the occupied territories, provided the German Government removes the restrictions against French planes flying over German territory.

GREAT BRITAIN

REPAIRS TO "WARSPITE" AND "RENOWN"

These ships are undergoing repairs at the naval dockyard at Portsmouth. The *Warspite*, the first of the Queen Elizabeth type of ships is to be bulged, following vessels of the *Royal Oak* class. It was noted that the bulge fitted to the *Warspite* was not the same as that seen on the *Royal Oak*, the difference being that the bulge did not run quite so high amidships, and the outboard surface instead of being a smooth curve had a fairly sharp angular bend, or knuckle, where the vertical side went, and not inclined to the original ship's side. It was stated that as the ships were being bulged they were still experimenting and that probably the next vessel would have a still slightly different form of bulging.

It was noted that the forward smokestack had been removed, and it was stated that the alterations to the vessel included the installation of one large stack in place of two, so that when completed the vessel would resemble the *Royal Oak* class, the general location being

in the space between the two old stacks. It was stated that this was being tried as an experiment to clear the gases off the foretop and bridge, and that no further vessels would be modified until after the *Warspite* had had extensive trials in service. It was also stated that the dockyard officials doubted whether this change would make any particular difference.

The A. A. battery of the *Warspite* was being changed from two 3-inch to four 4-inch A. A. guns, mounted two on each side in the same general location on the superstructure deck as the old A. A. battery.

The vessel was in what is known as "dockyard control" and only had 65 enlisted men lodged on board. The ship was very dirty and it was noted that the dockyard workmen had broken open and damaged a great many of the metal lockers provided for the crew's clothing; also, the tiling in the galley and bakery was broken and torn up. In general the condition of the vessel, as regards care and maintenance was far below the standard that would be maintained in any United States navy yard under similar conditions.

It was understood that no particular changes were being made in fire-control installation or in any electrical circuits or leads.

The *Renown* is undergoing a long refit and is apparently being used as a stop-gap for dockyard labor, in order to stabilize the number of workmen. It was stated that this vessel would not be completed for service in the Atlantic fleet prior to June, 1926, at the earliest, and that there were no definite instructions as to where this vessel was to be completed. All of the quarters which had been equipped for the Prince of Wales and his suite had been torn open and the fittings removed for installation on the *Repulse*. This part of the ship was not being touched, no instructions having been received concerning it. Due to the increased displacement since installing additional armor and blisters, it had been found necessary to increase the size of the bower anchor chain cables and this had necessitated a large amount of work on the anchor gear. A large amount of electrical cable was being rerun, it being stated that the original work done during the war had been found quite unsatisfactory.

GREAT BRITAIN

THE GUNNERY SCHOOL AT WHALE ISLAND

The following is an outline of the qualifying and advanced courses for gunnery and torpedo officers to the gunnery school, Portsmouth, gunnery school, Whale Island, and the torpedo school, Vernon.

Section I. *Qualifying courses.*—

1. Gunnery and torpedo officers selected to qualify in gunnery and torpedo will undergo a preliminary course at the Royal Navy College, Greenwich, lasting one session (three terms), commencing with the autumn term. After two terms an intermediate examination will take place, and on completion of the course a qualifying examination will be held. Details concerning the subjects of study and periods devoted to each subject in these preliminary courses are published in Admiralty Fleet Orders.

On completion of the preliminary courses officers will proceed to the gunnery or torpedo school at Portsmouth for the practical course lasting: In gunnery, 190 working days (about 9½ months); in torpedo, 205 working days (about 10 months).

A final examination is held on conclusion of the practical courses and certificates are awarded on the result of this examination on the following basis: 80 per cent will be required for a first-class certificate; 65 per cent will be required to qualify (second-class certificate).

The Commander Egerton prize, awarded to the officer who passes the best examination in practical gunnery, will be awarded on the result of the final examination in gunnery. The Ogilvy medal is awarded on the result of the final examination in torpedo.

A selection of officers for the advanced (G) and (T) courses (see Section II, par. I) will be made by the Admiralty on the recommendation of the captain of the schools on conclusion of the courses.

Sec. *II. Advance courses.*—

Gunnery and torpedo officers selected to qualify as lieutenants (G) or (T) will be appointed to the Royal Navy College, Greenwich, at the commencement of the Christmas term to undergo a course of instruction lasting two terms.

Detailed syllabuses of these advanced courses are given in Admiralty Fleet Orders.

An examination will be held on completion of the course. This examination is a qualifying examination only and no classes of certificates are awarded. The officers who obtain the highest marks in the (G) or (T) examination will be awarded a prize of £201.

Officers who qualify in these courses are usually appointed for a period on the instructional staff of the respective schools.

The following is an outline of the scheme for training enlisted men at the gunnery school and the torpedo school:

	Fire control	Field training, musketry	Other gunnery subjects [1]	School [illegible]	Total length of course
	Number of days	*Number of days*	*Number of days*	*Number of days*	*Number of days*
Gunner's mates, qualifying	5	25	75	40	140
Seamen gunners, qualifying	5	15	35	----------	55
Turret director layer, qualifying	5	----------	15	----------	20
Light director layer, qualifying	5	----------	20	----------	25
Gun layer, first class, qualifying	5	----------	35	----------	40
Gun layer, second class, qualifying	5	----------	35	----------	40
Range taker, first class, qualifying	----------	----------	----------	----------	20
Range taker, second class, qualifying	----------	----------	----------	----------	17
Range taker, third class, qualifying	----------	----------	----------	----------	12

[1] Includes gun drill, stripping, machine guns, ammunition, hydraulics, turret drill, etc., amount of time allocated depending on the rating for which qualifying.

Torpedo school—Outline of scheme of training enlisted men

	Torpedo	Torpedo control	High-power electrical	Low-power electrical	Mining and explosives
	Number of days	*Number of days*	*Number of days*	*Number of days*	*Number of days*
Torpedo gunner's mate, qualifying	30	10	25	20	8
Leading torpedo-man, qualifying	20	5	10	10	6
S. T., qualifying	18	2	10	10	5
Electrical artificer, fifth class, qualifying	53	2	25	20	10
Electrical artificer, fourth class, qualifying	28	2	25	15	5
R. N. V. R. men	General 10 days.				

The system of training at this school is quite different from the method of gunnery training in the United States Navy. This is well exemplified by the procedure being followed in connection with the development of an antiaircraft method of fire control and procedure. In the United States service various systems are tried out in the fleet and as a result a standard system is developed for the use of the fleet, subject to minor changes due to the development of ideas. In the British Navy a standard system is first developed at the gunnery school and then sent to the service for trial and test, and no modifications are allowed until every well-thought system has been given a good trial.

The instruction of gunnery personnel, although amply supplied with ordnance material of all the older types, is being seriously handicapped by new developments and the desire for economy. Whale Island has a fairly complete set of instructional gear similar to that installed on H. M. S. *Hood*, but none of this gear is available at the other gunnery schools, and none of the gear pertaining to the *Nelson* and *Rodney* is available at any of the gunnery schools. Thus the instructional turret drill at all of the gunnery schools is

confined to a 13-inch two-gun turret, whereas the turret firing on the *Tiger* is done with 13½-inch guns. It is therefore believed that this system is not working particularly well at the present time, and the officers at the gunnery school admit that the greatest stress is being laid on discipline and general ordnance knowledge rather than the acquiring of technical details.

It is believed that very little real development has taken place as regards A. A. fire control. There are several antiaircraft range and height finders of the Barr & Stroud Co. U. B. 4 type, and the range takers are drilled with these, taking ranges on airplanes which fly over from Calshot, the nearest R. A. F. base. Several attempts have been made to develop a satisfactory data for gun layers, but no really satisfactory apparatus seemed to exist, and it was understood that appeals had been made to the gunnery schools, Portsmouth, Devonport, and Chatham, to solve this problem. It was also understood that the apparatus being developed at Devonport was looked on with the greatest favor by the Admiralty. This is a device employing moving pictures of an airplane projected on a screen, securing it at an angle between the ceiling and the side wall of the room, so that the mean gun angle of elevation is about 60 degrees. No further details of this apparatus could be obtained.

The two best schemes at Portsmouth were (*a*) a 60-inch parabolic searchlight mounted vertically over the A. A. gun and painted to represent a sky background. A minute model of an airplane moving around over this surface was controlled by a magnet on the back of the mirror; (*b*) a system of mirrors for reflecting a small model of an airplane on an overhead mirror moving on a circular track about the A. A. gun. The only advantage of this scheme over (*a*) was that the instructing officer standing on the floor could control the movements of the plane instead of having to coach an operator on top of a high ladder, as in (*a*).

The only mount at the gunnery school used for actually training the gun layers in the following of an airplane in flight was a standard 3 and 4 inch mount used in the fleet. The A. A. work is very backward, and is not believed to be up to the standard obtained in the United States Navy. No regular target practices are held firing against a towed sleeve, except by the British Army, and a few naval practices held against hot-air balloons drifting with the wind.

The impression gained was that so far as the enlisted personnel was concerned the instructions were following the usual standard lines laid down in "Gunnery Instruction Manual, 1921," and similar in all respects to that followed at Devonport and Chatham. The officers' instruction seemed to be very thorough, and, due to the com-

plete equipment for gun control (towers, director towers, turret booths, transmitting stations, foretop control stations, etc.), officers obtained an excellent idea of a general scheme of fire control and were given practical training in its applications. There is also an elaborate arrangement existing for spotting drill and simulating night firing for the training of gun layers and control officers. It is believed, however, that with the knowledge of the Whale Island school existing among officers of the United States Navy that a suitable development of a fire-control school at the Naval Gun Factory would enable us to obtain just as satisfactory instruction as regards fire-control gear but without the gun equipment and firing vessels. We have no similar school for the development of general gunnery knowledge.

GREAT BRITAIN

NAVAL NOTES

November, 1925

Establishment of cause of loss of submarine "M–1"

[From a State Department report]

The disaster to the British submarine *M–1* on November 12, while participating in maneuvers in the English Channel in the vicinity of Start Point, has now been determined to have been the result of her being struck when submerged by the Swedish steamer *Vidar*.

It has been explained that at 7.45 o'clock the morning of the accident the *Vidar*, in a heavy sea, suddenly struck something which the officers on board thought might have been a submerged mine. After a thorough examination of the hold had shown that there was no leakage or other damage, the vessel proceeded on her voyage. On arrival at Kiel Canal the captain learned of the sinking of the *M–1* and, the coincidence of time and place making him think that the submarine might have been the object his ship had struck, he reported his suspicions by wireless to his owners at Stockholm.

As soon as the *Vidar* reached Stockholm she was unloaded and put into dry dock. The examination of her hull took place on November 25 in the presence of Captain Agerton, British naval attaché to the Scandinavian countries, Swedish naval officers, and representatives of the steamship's company. In addition to dents in the stem and keel of the steamer, gray-green paint markings were discovered on the port side of her bottom. On analysis, these marks proved to be clear green paint. As the upper works of submarine *M–1* had recently been painted this color, this evidence is considered to establish beyond doubt the cause of the loss of the submarine.

[From the British press]

Battle squadrons re-formed

The reorganization of the battle squadrons, which is just announced, will not come as a surprise to those who have been watching the trend of events since the Great War ended. The scheme carries a step further a reversion to the policy of basing our most powerful battle squadron upon Mediterranean ports—a policy which was long acted upon prior to the time when the German menace necessitated the tethering of our strongest fleet to the North Sea.

Under the new scheme the Mediterranean fleet will include one battle squadron instead of two, as at present. This squadron will consist of six ships instead of eight, but the six ships in the re-formed first battle squadron will all be armed with 15-inch guns, whereas only four of the present eight are so armed, and the largest guns of the remaining four are 13.5-inch. There will be the further advantage of the first battle squadron being composed entirely of oil-burning ships.

The second battle squadron in the Atlantic fleet will in future consist of three ships only instead of five, and in addition there will be in the Atlantic fleet the third battle squadron, which will consist of the four *Iron Dukes*, which are being withdrawn from the Mediterranean.

The novel feature of the scheme is the rôle which the vessels of the third battle squadron will fill, namely, that of a seagoing training squadron for boys under the orders of the commander in chief of the Atlantic fleet. No training squadron for boys on such a scale as this has ever before existed in our navy. Before the last training squadron for boys was abolished that squadron consisted of comparatively small protected cruisers.

H. M. S. "Rodney" launched

H. M. S. *Rodney* was launched at the Cammell-Laird Shipyard at Birkenhead, on December 17, 1925.

"The *Rodney* has been nicknamed as of the 'cherry tree' class," said W. C. Bridgman, First Lord of the Admiralty, "because both she and the *Nelson* were cut down by Washington."

The *Rodney* is the last battleship which Britain will launch under the provisions of the Washington treaty for eight years. Some advocates of the submarine and airplane have stated that she was the last battleship which Britain will ever launch, but Rear Admiral Sir Alfred Chatfield, head of the Admiralty Staff at Liverpool, declared in a speech at the launching that the Admiralty looked to

her to be rather the first of a great line. While all previous battleships, he said, had been built by men who had imagined what a naval battle would be like, the *Rodney* had been designed to meet the requirements of the naval staff, who were seeking to put into her the outcome of their wartime experience.

GREAT BRITAIN

AVIATION NOTES

Activities of the Royal Canadian Air Force

[By Maj. P. L. Holmes, D. S. C.]

The Canadian Government has approved a scheme for the exchange of British and Canadian Air Force pilots. This announcement is of interest from the naval standpoint because a considerable amount of work in the Canadian Air Force is carried out with flying boats. Further, the training obtained by the personnel of the R. C. A. F. is, perhaps, somewhat unique, because practically the whole of the flying carried out is in connection with civil operations in conjunction with other Government departments, and these are a great asset to the air force. Apart from the direct value of the training in flying under varied conditions, in photography, navigation and observation duties, in wireless communication, and the maintenance of aircraft and engines, work of this kind strengthens the initiative and resource of the officers and men in a way that no program of routine training can possibly do.

It may be of interest, therefore, to touch briefly upon some outstanding work carried out by the Royal Canadian Air Force with flying boats during 1924.

An important item on the program for last year was fishery protection work on the northern British Columbian coast. This was done by two H. S. 2–L flying boats from Vancouver air station, operated from a temporary base at Prince Rupert. One hundred and fifty hours' flying carried out on this service during the season. Flying over these waters is never easy, owing to the prevalence of rain and fog and the uncertainty of the weather; therefore it is a tribute to the skill and perseverance of the officers and men engaged in the work that patrols satisfactory to the fishery branch have been maintained. These patrols were operated to observe that nets of an illegal length were not used; that fishing was not carried on during the week-end closed season, from 6 p. m. on Friday to 6 p. m. on Sunday; that no fishing was done in restricted waters, and that the fishing regulations, generally, were adhered to.

To illustrate the nature and extent of these patrols, the following extracts from the report of a week-end's work may be of interest: On August 2, 1924, H. S. 2–L *No. BB* left Prince Rupert at 5.55 a. m. to watch for infractions of the week-end closed season regulations. Visibility was poor, the fog bank stretching over the entire district prevented flying at an altitude of more than 100 feet over the water. A landing was made at 6.15 alongside the fishery patrol boat *Rividis*. At 7.35 the patrol was continued with the fishery supervisor of the district on board. Hartley Bay was reached at 7.55, having landed en route to investigate the suspicious movements of a boat. The supervisor having given some instructions to his local patrol men, the machine left again at 8.20 in search of the fishery patrol boat *Leinsh*, reported in distress. A landing was made at Finn Island at 8.45, and after a short stay the patrol was resumed. The patrol boat *Gene* was sighted and the machine alighted alongside her in a fairly rough sea. At 10.50 the patrol was continued at a height of 1,500 feet, the fog having cleared, and the machine proceeded to operate on these lines until 3.40 p. m. At 6.6 p. m. the flying boat started on a second patrol which lasted until 7.45 p. m. The total flying time for the day was 5 hours 55 minutes; the distance covered, 370 miles; and 12 landings were made. On the second day the flying time was 5 hours 12 minutes; distance covered, 330 miles; landings, 7. On the third day the flying time was 3 hours 50 minutes; distance covered, 220 miles; landings, 4. The total for this week-end was: Flying time, 14 hours 57 minutes; distance covered, 920 miles; number of landings, 23.

Obviously, work of this nature provides excellent training for the personnel of the R. C. A. F. for cooperation with surface craft in searching for submarines and other duties which flying boats might be called upon to perform in war.

Flying boats from Vancouver also carried out numerous patrols at the request of the customs authorities. Among the important flights was one for the purpose of escorting the *Empress of Asia* when it was suspected that an attempt would be made to smuggle narcotics from the liner to motor boats. Several high-powered boats were observed unmistakably standing by for the purpose. A roll of tar paper and refuse, including a basket, were thrown overboard from the liner and were examined by the seaplane. This appeared to be an effort on the part of some one on board to find out just how much could be observed from the air. No opportunity was given the motor boats in the vicinity to pick up any articles thrown overboard.

On another occasion a four-day trip was made for the purpose of cooperating by air with H. M. C. destroyer *Patrician* and coast

defense patrol boat *Armentiers* in an effort to apprehend a smuggling boat suspected of being in hiding off the coast Vancouver Island. On this occasion a naval officer was carried as observer.

In addition to seaplane patrols on both the east and west coast of Canada, six Vickers *Viking* amphibian flying boats, fitted with Rolls-Royce "Eagle IX" engines, carried out 1,183 hours flying, covering a distance of some 76,895 miles, over Manitoba and Saskatchewan. These flights were made for the purpose of locating forest fires, timber cruising, and aerial photographic survey work.

This squadron, with its main base at Victoria Beach, at the southern end of Lake Winnipeg, performed the most important aerial survey operation of the year. This was the oblique photography of the watercourses of The Pas to Pukkatawagan, thence west along the Churchill River to Reindeer River, then north to Reindeer Lake, over its entire area, thence in a westerly direction along the Churchill River to Stanley Mission, and on to Isle-a-la-Crosse, and south by the Beaver River to the Saskatchewan River at Prince Albert.

This required very careful planning in advance, as the territory is quite beyond the ordinary means of transportation, and, therefore, refueling bases had to be established along the route. The total flying time from the moment the *Viking* left the base to her return was 44 hours 10 minutes. The distance flown was 2,810 miles, and some 1,700 photographs of uncharted territory were obtained. This flight is certainly the greatest ever undertaken for aerial survey, and when considered in the light of practical results is one of the most brilliant achievements in the history of flying. Some idea of the difficulties which had to be met may be gleaned from the fact that the most northerly point reached was about 1,000 miles from the base and several hundred miles beyond any railway or steamboat communication.

The machine had to carry spares and emergency rations besides a crew of four and the photographic gear. This necessitated the removal of the amphibian landing gear in order to get her load down to the permissible weight. This, combined with the fact that intense cold was experienced, proves the wonderful reliability of the Rolls-Royce engine and the Vickers *Viking* amphibian, a combination which the official report states ran like a motor car. This flight may certainly be regarded as a triumph for British marine aircraft.

Blackburn Torpedo-carrying Seaplane Made by Leeds Co.

[From a consular report]

TEST OF TORPEDO-CARRYING SEAPLANE

On October 28, 1925, at Brough, Yorkshire, in the presence of the representatives of a number of nations, the Blackburn Aeroplane and Motor Co., (Ltd.), of Leeds, demonstrated its new torpedo-dropping float seaplane called the *Velos*. The test is said to have been highly successful.

The *Velos* is a biplane equipped with floats which are especially separated so as to allow the torpedo to be carried immediately under the fusilage, which has been strenghtened for protection against the splash occurring when the torpedo strikes the water.

According to press reports, this new Blackburn torpedo seaplane is a development of the Blackburn *Swift* and *Dart* airplanes which are already familiar to the world's navies. Its engine is a 450-horse-power Napier *Lion*, and, according to reports considered to be reliable. The seaplane is 36 feet in length, has a span of 48 feet, and is 12 feet 6 inches in height.

The plane carries a Mark VIII torpedo, but in the demonstration a dummy wooden torpedo was used. The *Velos* is understood to have been the first float seaplane built in England especially as a torpedo dropper since 1918 and is said to be able to leave the water in about 20 seconds, to cruise at 120 miles per hour, and to sweep at a still higher speed.

The *Velos* can be used either as a torpedo dropper or as a bombing plane and appears to be equipped with a gun ring and two Lewis guns, the gunner observer being seated in the cockpit immediately behind the pilot.

Descriptions of the demonstration were given in The Aeroplane of November 4, 1925, and in Flight of November 5, 1925.

THE BLACKBURN CO.

The business of the Blackburn Co. started in 1908 and the firm was incorporated in 1914 as the Blackburn Aeroplane and Motor Co. (Ltd.), with head office at Roundhay, Leeds, the plant there being known as Olympia. During the war the company produced large numbers of planes for the British Government, but suffered heavy losses in the postwar slump. During the first years of the slump the company was building the Blackburn automobile and also bodies for trucks, busses, and automobiles in order to help keep the plant going and the staff intact. In the last couple of years, however, airplane business has improved and the factory presents a busy appearance, with about 1,000 men employed at the Olympia plant in addi-

tion to those at the flying field, aerodrome, and assembling factory, all of which are at Brough, on the River Humber, 10 miles west of Hull.

The construction of automobiles and automobile bodies has been abandoned and the plant is devoted exclusively to the manufacture of airplanes and component parts thereof.

BRANCH FACTORY IN GREECE

The company now has a branch factory at Phaleron, Greece, and the managing director is at present visiting there. Local officials state that the Phaleron factory is not simply an assembling plant but that airplanes are actually built in Greece and that machinery and skilled British workmen have been sent there. The local officials imply that they do not yet build in Phaleron airplanes for sale to other Mediterranean countries than Greece. No information relative to the volume of output in Greece has been obtained by the Leeds consulate.

BLACKBURN METHODS AND POLICY

The greater part of the Blackburn-Olympia works at Leeds were seen, and, while favorably impressed by the quality of workmanship and the machinery used, it was evident that quantity production was not being attained. The management likes to emphasize the carefulness of the inspection and the painstaking and systematic care given to the construction of all parts of the airplanes.

Inspection of materials, parts, and processes appears to be carefully carried out, and all parts, both metal and wooden, are examined and marked by inspectors. All materials and parts for use in aircraft for the British Air Ministry are inspected a second time by the ministry's official inspecting engineers, several of whom are assigned to the Blackburn factory.

The testing of materials is done at the plant or in collaboration with the department of physics at the University of Leeds.

The officials state that they have at the Leeds factory no air tube for making experiments and that work of this kind has to be done at the factory of the British Royal Air Force in the south of England.

The aircraft are not completed at the Leeds factory but are assembled and tested at the works located at Brough, where there is a flying field of over 100 acres with three large hangars and two slipways leading to the adjacent River Humber, where seaplanes are launched.

The company emphasized the accuracy and interchangeability of the parts made by it. In this connection it is of interest to mention that nearly all of the several hundreds of lathes, drillers, and auto-

matic metal-working machines came from the United States (especially Rhode Island and Connecticut) and are said to be highly satisfactory.

One of the Blackburn officials stated with pride that the metal framework of their aircraft was not welded together, but was fastened together by carefully made joints with separate bolts and nuts for different members. He stated that the American Navy world flight planes which stopped at the Blackburn factory in Brough, near Hull, when they passed through England, had some welded joints, but that this type of construction was not approved by the Blackburn engineers, as it gave varying results.

THE FACTORY IN LEEDS

The Olympia factory is situated on the northern outskirts of Leeds, in rustic and comparatively healthy surroundings, and the men are working under good conditions and appear to be of high average intelligence. The labor turnover is said to be very small. Very few women seemed to be employed except as clerks and typists and in the wing painting and spraying departments.

The company uses Alaska spruce in its planes and Honduras mahogany for its propellers, obtaining these woods from timber importers in Liverpool.

Although the company states that only the best material goes into its planes, it was noted that two short pieces of wood carefully spliced together and wrapped were used as the main beams for the wings for some of the larger aircraft instead of long pieces of wood, which, it is said, are difficult to procure.

LIGHT AIRPLANE

The graceful and small Blackburn *Blue Bird*, single-seated biplane for flying-club use is quoted at about £750 ($3,750). It is equipped with a 1,500 C. C. engine, rated at 15–40 horsepower, and its landing speed is placed at 35 miles per hour.

GREAT BRITAIN

THE MOSUL DECISION

[Source, M. I. D.]

At a private session of the Council of the League of Nations on December 15 it was decided to give Mosul as far north as the Brussels line to Iraq under the condition that Britain renews its mandate over Iraq for 25 years.

The decision followed the reading of the full report of General Laidoner, of Esthonia, the head of a commission which had been sent to investigate conditions in Mosul. This report bitterly denounced Turkish atrocities in the district and branded the Turks as bloodthirsty, cruel, and uncivilized. Press reports emphasize the fact that General Laidoner is no sentimentalist, having shown no evidence of weakness along that line when he ordered 150 Bolshevists shot in a single afternoon to repress a revolt in his own country. The Turks naturally denied the charges made in the report and asked, with much interest, how much General Laidoner was to receive for his services on the commission.

By requiring Great Britain to negotiate certain financial arrangements with Turkey the council softened the blow to the Angora Government. Whether this form of easing Turkey down will satisfy Mustapha Kemal and other Turkish leaders remains to be seen, and there is still a possibility of open warfare, which will, however, even if eventually decided upon, probably be delayed till early spring.

A struggle of this kind never remains an affair of two antagonists but soon becomes a triangle of forces, the two opponents maneuvering always with an eye and an ear to the third party, world opinion, particularly that portion of world opinion which believes in promoting fair dealing in the affairs of men. The comparatively trivial strip of land involved in this case has assumed an importance far beyond any bestowed upon it by nature even though it may serve at present to hide oil wells of more or less importance. Public opinion, especially American opinion, while concerned to only a very limited extent in the real issue at stake, that is, the settlement of the boundary between these two far-distant States, has stood by, watching with the most intense interest, the handling of the matter by the Council of the League of Nations and the World Court.

A complete American editorial press review of the affair would make most interesting reading just now. A few samples follow:

The decision of the League Council upon Mosul was assured in advance.—League authorities have no illusions regarding British motives for an interest in the region. England is not spending $20,000,000 a year upon administration without the hope of a profit in cotton, in grain; above all, in oil.—*New York World, December 16, 1925.*

What we dislike is the pietistic claptrap which invests this procedure with the aureole of altruism and human good.—Great Britain will get the oil and it may have to divvy up with some of the other claimants.—*Chicago Tribune, December 14, 1925.*

The Mosul business is bad all the way through. Oil rather than justice is sought by the nations concerned. There would be no such stubborn fight over a sandy and inhospitable vilayet were it not for the oleaginous inspiration.—*Cleveland Plain Dealer, December 12, 1925.*

Turkey is told she must abide by the decisions of the League of Nations, according to the decisions of the World Court, or become an outlaw. Turkey was induced to submit her case to the league on the promise of Lord Curzon, representing Great Britain, that the league would never take a decision on Mosul without her consent. Lord Curzon is dead. So is his promise. British policy, behind which the rest of the nations of the league have been ranged, demands Mosul (meaning the priceless oil wells) for Britain.—*New York American, December 11, 1925.*

The Mosul question presents the most difficult problem the Council of the League of Nations has had before it.—Turkey claims the entire province, and a commission sent out by the council to investigate the matter has expressed the opinion that technically the territory is still Turkish, never having been legally renounced by the Turkish Government. There are, however, substantial differences as to this, and there are economic, racial, and religious considerations that are in opposition to Turkey's claims. At the time the treaty of Lausanne was negotiated it was agreed between Great Britain and Turkey that a friendly effort to reach an agreement on this boundary should be made, failing in which the question should be referred to the council of the league. Without this agreement the council would have no authority to act in the case, Turkey not being a member of the league. But after having consented to this procedure Turkey set up the claim that it was persuaded to do so by the assurance of Lord Curzon that its representative would have a seat and a vote in the council, whose decision would necessarily be unanimous. Such an arrangement, of course, would have given either Turkey or Great Britain a power of veto over any proposal and prevent the council from coming to any decision not satisfactory to both.—*St. Louis Globe, Democrat, December 10, 1925.*

British opinion is divided on Mosul and the attitude toward Turkey. Even in conservative circles are some who have opposed from the beginning Britain's military obligations in Mosul. Military opinion, even during the war, was sharply divided on the expediency of carrying on a heavy campaign there. While the partisans of a vigorous military policy carried the day, there is still a strong minority opposition.

The point of view of the pro-Turk British is that Britain could make much greater headway in the Near East in friendly collaboration with the Turks than by fighting them. They would return Mosul to Turkey. It would be practical politics, they argue, because the oil fields can only be exploited through a pipe line crossing to the sea, through or in close proximity to Turkish territory. With a hostile Turkish army just a few miles across the frontier, exploitation would be impossible in any case. In the opinion of the British people with Turkish sympathies, much more can be gained by recognizing the sovereignty of Turkey and then developing the extensive economic concessions they think would follow.

There are further political differences over Mosul. The French participate in Turkish petroleum and at the same time are said to be encouraging the Turks. The Germans are suspected in certain

quarters of always being ready to lend some assistance to the Turks so long as it does not embroil Germany with the Allies. The soviet government is believed to be willing to back the Turks so far as it helps to embarrass Great Britain. In such a cockpit, petroleum companies are reluctant to put in much real money, and all of them are evincing a desire to do business in Mosul, spending as little as possible.

From time to time since the war Mosul has been regarded by some experts as one of the greatest untapped oil or petroleum sources in the world, probably rivaling the south Persian fields, where Britain holds a dominant position. Immediately after the war and before a truce was concluded by the British, American, French, and Dutch oil combines, which gave all of these practically equal footing in Mosul, it was charged that, under the guise of military occupation, the British Government had prevented foreign experts from undertaking an exhaustive survey. At the same time it was said, though the British were quick to deny the allegations, that certain British experts then filling military rôles were themselves giving Mosul a very acute "once over."

The Mosul fields are regarded by the directorate of the Anglo-Persian Co.—in which the British Government itself has the controlling interest (owning two-thirds of the shares)—as a reserve source of supplies, the British Navy's chief source of oil fuel being southern Persia.

No survey of the oil situation in this region can be either complete or absolutely correct. The more one studies petroleum literature the more one is astounded by the contradictory statements contained therein. For an outsider, who has no authentic record of the large trusts at his disposal, since they keep a large part of the records of their deals secret, discussing the oil situation is merely taking a shot at the truth. But, notwithstanding statements to the contrary, it is generally believed that there is plenty of oil in commercial quanities in Iraq, and that the Turkish Petroleum Co. will be successful in its development very soon after the settlement of the Mosul frontier question.

In order to bring Iraq oil to the markets of the world, a pipe line to the Mediterranean Sea must be constructed. If the first wells brought in by the Turkish Petroleum Co. are big producers in the immediate Mosul area, economic reasons arising from the shortness of the route would most likely necessitate the alignment of the pipe line from the wells directly to the east across the desert to the Mediterranean Sea.

In this connection the question arises as to whether a pipe line through French mandated Syria would be a safe investment. The

British are firmly convinced that French-controlled territory is to be avoided. From this arises the British policy, and the British work during the last year and probably longer, to avoid the construction of a pipe line through Syria and to insure its construction through "all-British" territory—Iraq, Transjordania, and Palestine.

GREECE

NAVAL NOTES

[From the British press.]

New submarines to be built in France

The Greek Government has just signed a contract (November 1, 1925) for the construction of three new submarines of 710 tons each, to be delivered within two years. The contract for all three has been placed in France, doubtless owing to the ceaseless activity of French representatives here during the whole summer and of the continual French propaganda in Greece. Two other submarines are in course of construction, each of 605 tons, which are scheduled to be ready in March and July next.

The new submarines will cost £115,000 each, the payment being made in 24 quarterly instalments, with 7½ per cent interest on the instalments still due after the delivery of the submarines.

British Naval Mission for Greek Navy

The decree of ratification of the British Naval Mission contract was signed at Athens, July 21, 1925.

The mission will be composed of—

Rank in Greek Navy	Rank in British Navy
Vice admiral	Rear admiral Cyril S. Townsend, C. B. (head of mission).
Captain	Commander ———.[1]
Captain	Commander F. Q. Champness.
Commander	Lieut. Commander E. E. C. Tufnell.
Commander	Lieut. Commander A. G. Talbot.
Paymaster commander	Paymaster lieutenant commander, H. P. Hunter, D. S. C. (secretary)
Logistis	E. W. Wakeham, M. S. M.

The main object of this mission will be the fighting efficiency, and the training and organization of the Hellenic Navy.

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[1] The name, etc., of the officer where omitted will be inserted when the appointment is made.

The duties of the mission will be as follows:

(*a*) To draw up a complete scheme of organization of the Hellenic Navy (matériel, personnel, and the duties and establishments of every branch of the naval service which is represented on the staff of the mission), and to see to its application until the termination of the present contract.

(*b*) To organize and direct the training of the personnel of all branches of the Hellenic Navy and naval air service.

(*c*) With the approval of the Minister of Marine, the vice admiral, head of the British Naval Mission, shall have the necessary authority over all the branches of the Hellenic naval service to enable him to carry out these duties in the most efficient manner.

ITALY

NAVAL NOTES

On November 20, 1925, a naval division of the Red Sea and the Indian Ocean was established under the command of Rear Admiral of Division Ugo Conz, who has hoisted his flag on the *San Giorgio*.

Formerly Italy had a "high naval command" in the Red Sea and Indian Ocean, under Capt. G. Gregoretti. Rear Admiral of Division Conz was commander of the naval division in the Far East, recently abolished.

The destroyer *Francesco Nullo* was launched at Fiume in the Carnaro yard on November 15, 1925.

In accordance with royal decree No. 2008, dated November 5, 1925, the torpedo boat *25 A. S.* has been stricken from the list.

In accordance with royal decree No. 1980, dated October 29, 1925, the tug *N. 213* has been stricken from the list.

Builders' trials of Lombardi torpedo

On November 24, 1925, a visit was made to the Silurificio Italiano at Naples and the information given below was obtained verbally from the officials of the company.

The official trials of the Lombardi torpedo have been greatly delayed because of some unsatisfactory performances during the preliminary trials and consequent necessary modifications.

On the first trial runs, the depth control was unsatisfactory, the path being a sinusoid in the vertical plane. To overcome this defect, the following changes were made:

(*a*) Approximately half a kilo additional weight was added to the bottom of the pendulum.

(*b*) The rudders were moved from forward of to abaft the propellers.

(c) Moved gyro and servo engine from forward end of engine compartment to the depth chamber.

Trial runs after these changes had been effected showed satisfactory depth control.

The double gyro gear intended for these torpedoes was found to be unsatisfactory, and a single gyro is being used instead. The speed of rotation of this single gyro is maintained by regular impulses, controlled by means of a valve gear operated by a cam. This gyro functions satisfactorily for a period of 45 minutes.

Experimental development of the double gyro will be continued.

It was stated that during trial runs made after the modifications mentioned in the third paragraph above had been effected a high speed of 44 knots was attained and the consumption of air was very low. The builders expect to get a maximum speed of 48 knots.

It was stated that the official trials, which representatives of the United States Navy may witness, will be held in the early part of January, 1926.

ITALY

AVIATION NOTES

Affiliation of the Fokker Co. with the Romeo Co. for building Fokker airplanes in Italy

According to information received from the Italian commercial representative of the Fokker Co. an agreement has been made with Engineer Romeo, general manager of the Nicolo' Romeo Engineering Co., for the construction of Fokker planes in Italy. Heretofore the Italian Government has not bought any quantity of Fokker planes, partly because of the opposition to the purchase of foreign-built machines. It is believed that the Fokker Co. hopes to overcome this opposition through the affiliation with the Romeo, whereby the planes will be built in Italy and through the influence of Mr. Romeo.

Two Fokker planes are now at the Montecelio airdrome, at the disposal of the Italian authorities for inspection and tests.

It is understood that the Fokker machines will be built at the Officine Ferroviarie Meridionali plant (of which Engineer Romeo is general manager) at Naples. It is said that some Dutch engineers and skilled workmen of the Fokker Co. will be sent to the Naples plant to supervise the construction, but that the main body of workmen will be Italians. The parties concerned hope to sell the Italian-built Fokker machines in Italy and also in other countries.

The "Giuseppe Miraglia" cup race

The Italian Air Ministry has inaugurated a competition meet for military seaplane squadrons, similar to the "Baracca cup" competition for landplane squadrons, described in reference. The seaplane competition meet is called the "Giuseppe Miraglia" cup, in honor of the Italian seaplane ace who was killed in action during the World War. The Italian airplane tender *Giuseppe Miraglia* was also named in honor of this hero.

The object of the competition is to select and award the seaplane squadron which shows the highest general efficiency. In determining the general efficiency, the following are taken into consideration: Punctuality in getting under way; formation in taking-off and landing; regularity of velocity around prescribed circuits; total flying time; formation in flight; forced landing during the competition; employment of reserves; bombing, photomachine gunning, and photography; and accuracy in flying (passing over prescribed points).

The first "Giuseppe Miraglia" seaplane competition was held in Venice on October 25 and 26, 1925. The Air Ministry allotted 300,000 lire for distribution among the personnel of the winning squadron. In addition to these cash prizes, Signor Cosulich, director and principal owner of the Cantiere Naval Triestino, offered a gold and bronze cup, which will be permanently assigned to the squadron which wins the competition twice—not necessarily in consecutive years.

The two circuits prescribed for the competition were: First, Venice, Grado, Monfalcone, Trieste, Pisano, Venice; second, Venice, Chioggia, Magnavacca, Ravenna, Rimini, Magnavacca, Venice.

The squadrons participating in the competition this year were as follows, arranged in the order of relative general efficiency as determined by the completion:

Squadron No.	Class	Type of seaplane	Home base
1. 143	VO	M–18	Venice.
2. 187	VO	S–16–ter	Spezia.
3. 164	VF	M–7–ter	Venice.
4. 166	VF	M–7–ter	Taranto.
5. 188	VO	S–16–ter	Pola.
6. 163	VF	M–7–ter	Siracusa.
7. 142	VO	M–18	Taranto.
8. 161	VF	M–7–ter	Spezia.

Characteristics of a new type of observation landplane—"A–155"

The Italian Aeronautical Press reports that the Ansaldo Co. has just completed the construction of a new observation plane, two-seated, to be designated *A–155*. A series of tests will now be carried out by the constructing firm, after which the new plane will be submitted to the Italian engineering division for official tests and approval.

The *A–155* is constructed entirely of wood, with the exception of the engine bed, which is of steel tubing. It is equipped with radio set and photographic camera. Armament consists of a Vickers machine gun, flexible mount, operated by the observer.

The following are the general characteristics of the machine

	Kilograms	Pounds
Weight of machine, empty	1,167	2,567.4
Useful weight	710	1,562
Total weight	1,877	4,129.4
Subdivision of useful load:		
Instruments	60	132
Equipment	113	248.6
Arms and ammunitions	52	114.4
Fuel	285	627
Crew (pilot and observer)	150	330
Load available	50	110
Total	710	1,562
Carrying surface	41.3 sq. m.	444.38 sq. ft.
Load per sq. m	45.4 kg.	9.08 lbs./sq. ft.
Load per HP	4.7 "	10.34 lbs.
Autonomy at 1,000 metres	3 hours 30 minutes.	
Theoretical coiling	7,000 metres	22,960 ft.
Maximum velocity	220 km./hr.	136 miles/hr.
Minimum velocity	85 "	53 "
Safety factor	9.	

Climb to:	
1,000 m. (3,280 ft.)	3′ 30″.
2,000 m. (6,560 ft.)	7′ 45″.
3,000 m. (9,840 ft.)	13′ 20″.
4,000 m. (13,120 ft.)	20′.
5,000 m. (16,400 ft.)	28′.

Italo-Soviet Commercial Treaty in Force

On November 21 the Italian Senate passed the royal decree of March 14, 1924, by virtue of which the Italo-Soviet commercial treaty was put into force.

JAPAN

NAVAL MANEUVERS

The following is an analysis of the Japanese naval maneuvers held from October 6–15, 1925, based on information obtained from official, reliable, and press sources.

The naval forces were divided into two opposing fleets, Red and Blue.

COMPOSITION OF FORCES

BLUE

Admiral K. Okada, commander in chief.

First fleet: Admiral K. Okada:
- First division, Admiral K. Okada—*Mutsu, Hyuga, Yamashiro, Fuso.*
- Third division, Rear Admiral Teraoka—*Kinu, Oi, Abukuma, Jintsu.*
- First destroyer squadron, Rear Admiral R. Takahashi, *Tenryu* (F.)—
  - Thirteenth division, Nos. *2, 4, 6, 8.*
  - Fifteenth division, *Hagi, Tsuta, Susuki, Fuji.*
  - Sixteenth division, Nos. *10, 12, 16, 18.*
- First submarine squadron, Rear Admiral Suyetsugu, *Jingei* (T.)—
  - Fourth division, *Ro–54, Ro–55, Ro–56.*
  - Sixth division, *Ro–57, Ro–58, Ro–59.*
  - Twenth-fourth division, *Ro–63, Ro–64.*

Second fleet: Vice Admiral H. Saito.
- Fourth division, Vice Admiral H. Saito—*Kongo, Hiyei, Kirishima.*
- Fifth division, Rear Admiral Yamamoto—*Yura, Natori, Nagara, Sendai.*
- Second destroyer squadron, Rear Admiral Nagasawa *Isuzu* (F.)—
  - First division, *Nokaze, Numakaze, Namikaze, No. 1.*
  - Fourth division, *Hakaze, Akikaze, Tachikaze, Hokaze.*
  - Fifth division, Nos. *3, 5, 7, 9.*
- Second submarine squadron, Rear Admiral Kawai, *Chogei* (T.)—
  - Fourteenth division, *Ro–26, Ro–27, Ro–28.*
  - Twenth-sixth division, *Ro–60, Ro–61.*
  - Seventeenth division, *I–51, I–52.*

Attached to the fleet:
- Destroyers Nos. *15, 17.*
- *Tokiwa* (mine layer).
- First mine-sweeping division, Nos. *1, 2, 3, 4.*
- Second mine-sweeping division: Two (2) boats.
- *Wakamiya* (airplane tender).
- *Mamiya* (provision supply ship).
- Aviation corps of Kasumigaura and Yokosuka naval air stations.

RED

Vice Admiral S. Furukawa, commander in chief.

Sixth division, Rear Admiral Nomura—*Nagato, Ise, Iwate, Nisshin.*

Seventh division, Rear Admiral Kanesaka—*Hirato, Yahagi.*

Third destroyer squadron, Rear Admiral Sakamoto, *Tatsuta* (F.)—

Second division, *Minekaze, Sawakaze, Okikaze, Yakaze.*

Third division, *Shiokaze, Shimakaze, Nadakaze, Yukaze.*

Twenty-seventh division, *Hishi, Sumire, Warabi, Ashi.*

Third submarine squadron, Rear Admiral Kishii, *Karasaki* (T.)—

Eleventh division, three boats, *Ro–51, Ro–53* (?).

Fifteenth division, *Ro–14, Ro–15, Ro–16.*

Sixteenth division, *Ro–17, Ro–18, Ro–19.*

Fourth submarine squadron, Rear Admiral Nakamura—

Third division, *Ro–11, Ro–12, Ro–13.*

Fifth division, *Ro–20, Ro–21, Ro–22.*

Twenth-third division, *Ro–3, Ro–4, Ro–5.*

First defense corps, Rear Admiral Endo—*Aso, Kurokami* (mine layers).

Second mine-sweeper division, four (4) boats.

Sixth mine-sweeper division, *Uranami, Isonami, Minazuki, Ayanami, Nagatsuki, Kikuzuki.*

Attached to the red forces:

Hosho (airplane tender).

Kamoi, Hayatomo (special service ships).

Aviation corps of Sasebo and Omura Naval air stations.

Summary of ships by types

	Blue	Red	Total
Battleships	4	2	6
Battle cruisers	3	0	3
Armored cruisers	0	2	2
Light cruisers	[1] 10	[2] 3	13
Destroyers	24	12	36
Submarines	17	17	34
Aircraft carriers	1	1	2
Mine layers	1	2	3
Mine sweepers	6	10	16
Submarine tenders	2	1	3
Tankers	[3] 3	----------	3
Miscellaneous	[3] 1	----------	1
Transports	[3] 2	----------	2
Total	74	50	124

[1] Two light cruisers used as destroyer flagships.
[2] One light cruiser used as destroyer flagship.
[3] These ships used as transports.

First period, October 6–8.

Blue fleet assembled at Ise-wan.

Red fleet assembled in Tokyo-wan.

Preparations for maneuvers.

Second period, October 9–11.

Assumptions

1. War has been declared between Red and Blue.

2. Red fleet has sailed from Yokosuka; destination, unknown.

3. Blue fleet augmented by one mixed brigade of the third army division has sailed from Ise Bay; destination, Suruga Bay.

4. Action takes place between Red and Blue off Shikoku Island, resulting in defeat and retreat of Red to Tokyo Bay.

NOTE.—For Red read United States; for Blue read Japan; for Yokosuka read Manila; for Ise Bay read Kure; for Suruga Bay read harbor in Luzon; for Shikoku Island read Philippines; for Tokyo Bay read Manila Bay.

During the second period maneuvers both the *Hosho* and *Wakamiya* were attached to the Blue fleet.

Operations

The Red fleet having taken refuge in Tokyo Bay on the night of October 9, the Blue first fleet, accompanied by transports carrying troops, proceeds toward Suruga Bay and the Blue second fleet arrives on the same night off Tokyo Bay.

The Blue first fleet is to attempt landing troops somewhere in Suruga Bay while the Blue second fleet blockades the Red fleet in Tokyo Bay. During the night of the 9th the Red third destroyer squadron and the third and fourth submarine squadrons sortied from Tokyo Bay for the purpose of attacking the Blue first fleet transports and ascertaining and reporting movements of the invading fleet.

Contact is made on the night of the 10th and Red sortie force delivered night attacks until the morning of the 11th, then retreated toward Tokyo Bay. During this retirement the Red sortie force was attacked by the Blue blockading force on the afternoon of the 10th but not before the Red sortie force had determined that the Blue transports with the first fleet was headed for Suruga Bay and had communicated this information to the Red commander in chief.

On the morning of the 11th the Blue first fleet attempted to land troops near Shimizu. Red aircraft based at Mishima and Oppama, numbering about 50, delivered attacks, and were opposed by Blue aircraft from the *Hosho* and *Wakamiya*. Also on the morning of the 11th two Blue planes from the *Hosho* bombed Yokosuka, and set fire to the navy yard.

COMMENTS BY PRESS ON RESULTS OF THE MANEUVERS

If we had been engaged in actual war it would have been difficult to defend the ships from airplane attacks by means of the 8 cubic centimeter anti-aircraft guns, and thus we see the necessity of proper defense against airplanes. Submarines also played an important part in the maneuvers. On several occasions capital ships were exposed to danger by attacks of submarines and airplanes, and even the stanchest advocate of the supremacy of the capital ship could not fail to notice it. Necessity for increase in the number of cruisers and destroyers were also seen, and the need of two airplane depot ships to a fleet.

The joint maneuvers between the army and navy were a failure, for the transports carrying the troops in actual combat would all have been sunk by destroyers, submarines, and airplanes. The army forces required more time than the navy forces in landing, due to difference of military equipment. The difference in military terms employed by the army and navy was another drawback, and the need for the unification of terms was noted.

Night flights were made from the Mishima drill grounds using a 50,000-candlepower searchlight.

Third period, October 12–15

Both Red and Blue fleets sailed from Tokyo Bay in a southeasterly direction under sealed instructions, which resulted in the opposing fleets being about 300 miles apart at the commencement of the war game.

It is assumed that the Blue forces have occupied the Bonin Islands, and are proceeding toward Tokyo Bay. The Blue force contained transports, and the *Hosho* was also assigned to the Blue forces during this third period.

Contact was made between the destroyers of the opposing forces on the night of the 12th, and resulted in fleet action on the 13th. This action continued after dark on the 13th until the war game was terminated some time during the night of the 13th.

On the 14th an aerial review was held at Yokosuka, in which 33 planes participated, and one plane laid a smoke screen in front of the returning fleets.

COMMENTS

The Blue force was superior in capital ships, having 7 to 4 for the Red, the assumption being that the two Red armored cruisers were capital ships. Forces were equal in submarine strength, but Blue was much superior in destroyers, having 24 to 12, and superior in air force, having the *Hosho* against the *Wakamiya*. The Blue formation provided for the capital ships and transports in the center, then a formation of light cruisers, outboard of which were the destroyers, and then the submarines. No information was obtained showing whether or not the formation was a circular one. Great importance was said to have been placed in aircraft scouting and aircraft communication and in fleet submarine tactics. Due to bad weather, it was said that the work of the airplanes and submarines was greatly hampered.

During the maneuvers of both the second and third period umpires were stationed on ships of both fleets and decision made as to extent of damage suffered by ships under fire. Admiral Suzuki, on the *Settsu*, was the chief umpire and was assisted by a staff of about 40. After the maneuvers were over a conference was held at Yokosuka, during which the maneuvers were thoroughly discussed.

CASUALTIES

October 7: While engaged in maneuvers in Isè-wan attacking plane *No. 369*, belonging to the *Hosho*, fell from a height of 100 meters and one officer was killed.

October 8: Seaplane *No. 191*, attached to first fleet, while engaged in scouting off Numazu, fell. Crew rescued by destroyer.

October 12: Submarine *Ro–21*, while engaged in maneuvers near Miyake-jima, sustained damage to the forward, side, and stern rudders by the heavy seas. The engines and wireless were also damaged. She drifted helplessly until discovered by the *Nisshin*, which towed her to Yokosuka.

October 14: Destroyer *No. 2* was seriously damaged when she collided with N. Y. K. steamer *Hokoku Maru* in Suruga Bay. The destroyer was crushed in at the bow and proceeded to Yokosuka for repairs.

GENERAL CONCLUSION

It is believed that the above maneuvers represented the three preliminary stages in a war between the United States and Japan. War having been declared, the first period represents the preparations for an attack on the Philippines.

The Japanese fleet is divided into two forces. One force meets and defeats the United States Asiatic fleet, which retires to Manila Bay, which is then blockaded by this same Japanese force. The other force convoys transports to some port fairly close to Manila Bay and attempts to land troops. This

force while landing troops suffers many casualties from attacks made by the remaining United States destroyers and submarines and by the United States air forces.

In the third period the assumption is made that the United States fleet has seized the Bonin Islands and is proceeding with transports and troops to retake the Philippines. The United States fleet is assumed to be superior in capital ships, destroyers, and cruisers, equal in submarines, but inferior in air force and mine layers and hampered by transports. The United States air force is assumed to consist mainly of observation and bombing torpedo planes, while the Japanese air force is assumed to have a great superiority in combat planes.

JAPAN

VISIT TO BATTLESHIP "FUSO"

The *Fuso* was recently visited at Kure, it having been understood that this battleship had undergone alterations to foremast and had been equipped with equipment for launching airplanes.

The escorting officer spoke English very well and was unusually outspoken in furnishing information. He stated that he wished to be frank and would answer questions freely unless the matter was confidential, in which case he would say so.

We were shown about the following parts of the ship: Main battery deck, secondary battery deck, navigating bridge, wardroom country, and Admiral's cabin. The *Fuso* is fitted with flag quarters; her crew consist of 1,200 men and 80 officers, including about 10 midshipmen. One of these midshipmen is an imperial prince: he occupies the chief of staff's cabin, the rest of the midshipmen swinging in hammocks. At the time of the visit the *Fuso* was undergoing minor repairs.

The escorting officer made statements as follows:

(1) *Fuso* has not been altered as regards installation of blister or increase in horizontal armor protection.

(2) At present director fire control is not used for the secondary battery, but this system will be installed in the near future.

(3) The platforms in the foremost are used as follows: Upper platform or top for controlling the fire of the main battery, using director system: second platform is used for secondary battery fire control: third platform contains tracking and other fire-control instruments: fourth platform contains searchlights; next platform is the navigating bridge, and below this is the main bridge.

(4) Just abaft the upper bridge and built around the legs of the foremast are two lookout stations on each side of the ship. These stations are also used for secondary battery fire control when divided fire is necessary.

(5) There are no fire-control stations other than in the foremast.

H.I.J.M.S. FUSO, 30600 tons, before alterations.

FUSO, after alterations.

(6) The turrets can be trained from only one position, and each turret gun can be elevated from only one position.

(7) A short-range practice for pointers and trainers is held, using the turret guns.

(8) Secondary battery guns can be trained and elevated by power as well as by hand.

(9) There are 300 rifles on board of the Japanese Army type.

The following observations were made:

Turrets Nos. 2, 3, 4, and 5 are equipped with turret-range finders, the turrets having been altered for this purpose. The turret-range finder casing is armored, is very large, and projects about 1 foot above the roof of the turret and about 3 feet beyond the sides of the turret. One end of the casing has a removable cover, which permits taking out the range finder. The casing is at least 3 feet wide and has an opening on the center line on top, closed by hatch cover, which permits the turret crew to leave the turret. There is also a door for this purpose under the overhang. The turrets were all carefully observed for evidence of ability to control the fire of the main battery using directorscope. All turrets have only three sight hoods, not including the sight hoods for the range finder, so that apparently the main battery can not be controlled from individual turrets using director fire control. The turrets of the *Fuso* differ in this respect from those of the *Nagato*, which have two additional sight hoods on No. 2 turret, as previously reported.

A platform has been built on No. 2 turret for the purpose, we were informed, of carrying an airplane. We were also informed that the only way in which this airplane could take off was from the water, the plane being lowered over the side by a crane. This was the only turret so equipped, and no other airplane stowage was seen on the upper deck.

On the forward part of the main bridge, on each side, is a 9-foot metal inclosed range finder. On the wings of this bridge, on each side, are mounts, which we were informed were for navigating range finders. No other range finders or mounts were seen on the ship.

Secondary battery guns. A semicircular armor protection which rotates with the gun, about 2 inches thick. The range and deflection dials are on the left side of the gun, and just abaft these dials and attached to a frame which is secured to the gun mount are electric range and deflection visuals. When the gun is not in use a wire screen is placed over the range and deflection dials for protective purposes and to prevent them from being handled. Orders are received at these guns by both voice tube and telephone. On the right side of the guns, just forward of the pointer's position, is a dial marked up to 50° and equipped with a pointer. It is

believed that the object of this dial and pointer is to give the approximate bearing of the target for each particular gun.

The *Fuso* is still equipped with torpedo nets. No gas-mask containers were seen.

On the navigating bridge were located two mechanical searchlight controls and in the center of the navigating bridge was a gyro repeater.

The ship was clean, all men seen about the decks were in clear clothes, and the men themselves appeared well set up and well developed physically. Men's clothes are stowed in white canvas bags, which in turn are inclosed in canvas bags painted black. Messing arrangements seem to be similar to those of our own vessels. Mess tables are of bright woodwork and the mess-table legs fit into sockets set into the linoleum. The food is carried from the galley in galvanized-iron containers fitted with covers. No other arrangements for keeping food warm were seen. We were informed that the men ate regular Japanese food, with the addition of bread.

The rifles are stowed in racks which are secured to the bulkheads on the secondary battery deck. The front sight of every rifle covered with a brass guard. The admiral's cabin is at the stern of the ship.

The forward smokestack has been altered to the extent that a lip sloping aft has been built on to the top of the stack on the forward side, the purpose of this alteration being to deflect smoke-pipe gases as much as possible from the fire-control stations in the foremast.

While it appears that the *Fuso* has undergone a certain amount of modernization, it is considered that this ship is considerably inferior to the *Nagato* and *Mutsu* as regards modern equipment.

JAPAN

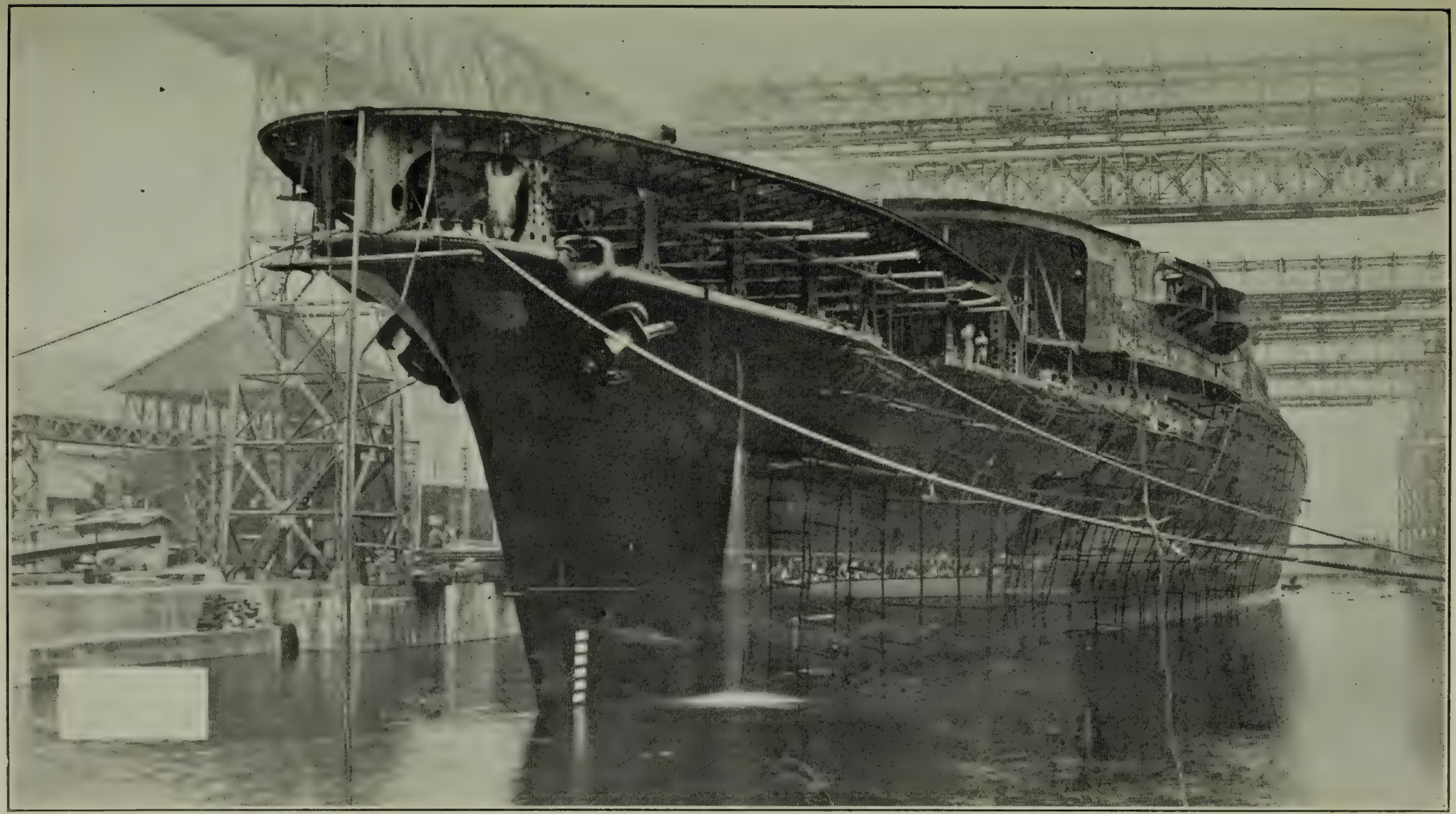
NOTES ON AIRPLANE CARRIER "AKAGI"

The *Akagi* was recently seen from fairly close-to at Kure Navy Yard. Referring to the photograph, vertical side plating is now being placed between the forward upper deck and the deck below.

The *Akagi* at present has a lower deck aft similar to the lower deck at the bow. This afterdeck has a dip at its afterend.

There are three or four 8-inch gun sponsons situated as shown. A close view of the stern was not had, so that the position of the remaining 8-inch guns is not known.

What appears to be the side-armor belt projects as far forward as about 75 feet from the bow and is estimated to be 6-inch armor, that is to say, the armor projects an estimated 6 inches from skin of the ship. It was understood that the smokestacks were to be outboard on one side and that the *Akagi* was equipped with "blisters."



AIRCRAFT CARRIER AKAGI

LIGHT CRUISER KINU

It has been stated in the press that numerous experiments and alterations have been made this summer on the *Hosho*, so that decision could better be made as to the design of the *Akagi*. It was noted that on the *Hosho*, when seen last summer, that the smokestacks and mast were at the side of the ship, clear of the flying deck, which was perfectly clear and flat. It is believed probable that the stacks, mast, and bridge of the *Akagi* will be on the side, clear of the upper flying deck, following approximately the arrangement on the *Hosho*.

A somewhat distant view of the *Akagi's* flying deck was had from the train while leaving Kure and showed no structures on the flying deck.

JAPAN

NOTES ON LIGHT CRUISERS

November, 1925

"*Kinu*"

Light cruiser of 5,570 tons displacement. The photograph shows clearly the location (forward of the bridge) of the hangar for one airplane and the permanent metal section of the launching platform. Additional demountable wooden sections of the launching platform are carried to the stem. The platform is simply a runway, no catapults having yet been devised. Ten light cruisers have been similarly equipped; they are probably the *Sendai*, *Jintsu*, and *Naka*, of 5,595 tons; the *Nagara*, *Natori*, *Kinu*, *Isusu*, *Yura*, and *Abukuma*, of 5,570 tons; and the *Kiso*, of 5,500 tons, which was the first vessel so equipped.

."*Kako*," "*Furutaka*," "*Aoba*," and "*Kinukasa*," (7,100-ton class)

During a visit recently made to the Kawasaki Dockyard Co., Kobe and Mitsubishi Dockyard Co., Nagasaki, the following information was obtained concerning this class of cruiser. Information contained in sentences which are inclosed by quotation marks was furnished by Japanese naval officers at these two shipbuilding plants.

"KAKO" AND CLASS

Six 8-inch single-gun turrets. The outer appearance of the turrets is very similar to the appearance of the turrets of the 5,595-ton cruiser class. The sketch of this cruiser gives a general idea of her outward appearance.

Torpedo tubes.—Eight tubes, located on the deck below the gun deck. There are two tubes forward and two tubes aft on each side, their approximate position being shown on the attached sketch.

The foremast of the *Kako* is of an entirely new design and consists of a hollow tube made up of riveted steel plates. The mast is oval in cross section and is tapered from top to bottom.

"The base of the mast is anchored to the protective deck, which is one deck below the gun deck. The longest diameter of the tube mast at the base is about 15 feet and at the top of the mast is about 8 feet. At the bottom of the mast the plates are about three-eighths inch to one-half inch in thickness and the plates are gradually lightened in weight from the bottom to the top of the mast."

At the top of the mast is a circular platform, over which is a metal hood. Below this top platform are two more platforms semicircular in shape on the forward side of mast. Below this lower platform is a bridge, and below the bridge and around the base of the mast on the gun deck are several compartments said to contain cabins, chart house, etc. On the appended sketch can be seen the general appearance of the mast.

"One director fire control sight is located on the platform on the top of the mast. A second main battery directorscope is located on the platform just below the top platform. The height of the mast from the gun deck is about 80 feet."

"There is no horizontal armor other than the protective deck made up of somewhat heavier plating."

"This class of cruiser is equipped with a modified blister below the side armor belt. Side-armor belt consists of about 2-inch armor plate."

Just abaft No. 2 stack is a compartment on the gun deck said to be an airplane hangar. The opening to this compartment being aft.

"A derrick is provided for lowering the airplane on to the water. No catapult or other means of taking off from the deck is at present provided. The hangar will house one plane."

"The escorting officer at the Kawasaki plant stated that the *Aoba* and *Kinukasa* would have three two-gun turrets instead of the six one-gun turrets, as on the *Kako*. The escorting officer at the Mitsubishi plant, Nagasaki, stated that it was his understanding that the *Kinukasa*, which is building at Kobe, is to have three two-gun turrets, but that it had not been decided whether or not the *Aoba* building at Mitsubishi, Nagasaki, would be so equipped."

It appears certain, however, that either one or two of the 7,100-ton class cruisers will have three two-gun turrets and the remaining cruisers of this class six one-gun turrets.

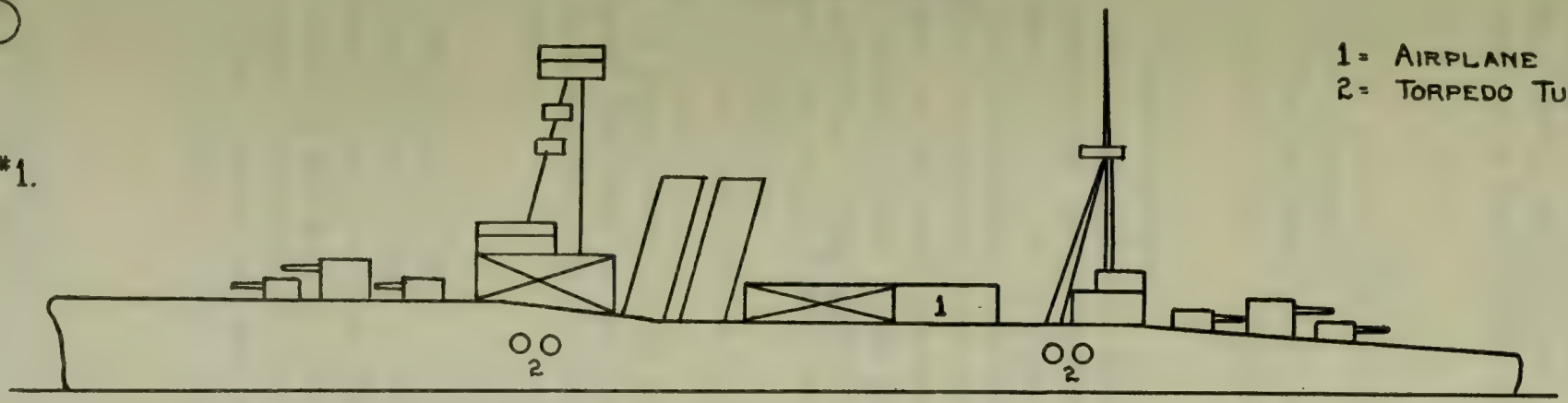
MAST SECTION

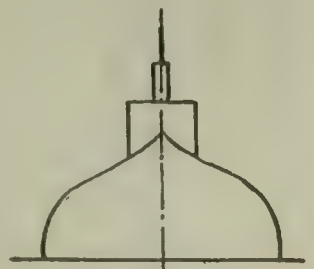
FORWARD

LIGHT CRUISER KAKO

1 = AIRPLANE HANGAR
2 = TORPEDO TUBES.

SKETCH *1.

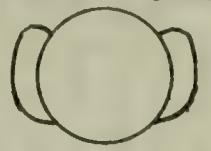




BOW VIEW
I-1 CLASS

CROSS SECTION
1970 TON CLASS

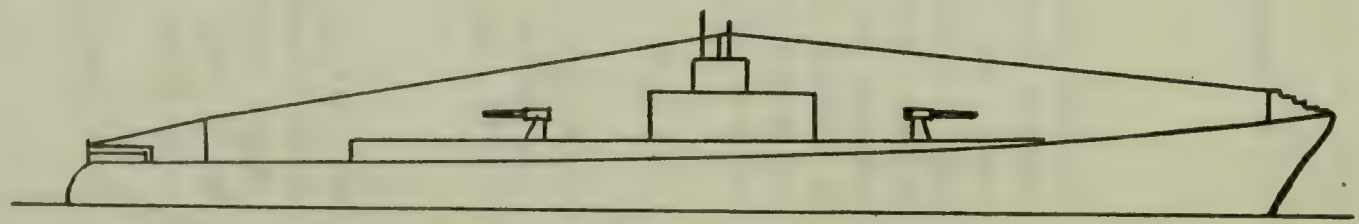
CROSS SECTION
998 TON CLASS



CROSS SECTION
I - 51

CRUISER SUBMARINE I - 1 CLASS 1970 TONS

SKETCH #2.



NOTE: CROSS SECTIONS OBTAINED FROM RELIABLE SOURCE

ENGINES

"Four navy type steam turbines fitted with Westinghouse reducing gears. The navy type turbine embodies the best features of both the Curtiss and Parsons turbines. Shaft horsepower of engines stated to be from 100,000 to 110,000."

BOILERS

"Ten express type water-tube boilers, two being fitted for using either oil or coal."

"The coal used is in small briquette form, as supplied by the fuel and oil depot at Tokuyama."

SPEED

"Speed, 33 knots."

One of the escorting officers was asked why it was that the *Kako* class 110,000 shaft horsepower could only make 33 knots, whereas the U. S. S. *Omaha* class, of 7,500 tons displacement, with about 90,000 horsepower, could make about 35 knots. The reply was that the *Kako* class were actually of greater displacement than the *Omaha* class because the displacement of the *Kako* class was 7,100 tons, not counting the fuel. This officer went on to say that this method of computing displacement was prescribed by the Washington treaty and that this method of computing displacement was first used for the *Kako* class.

"The *Furutaka* has recently completed her trials, which were very successful."

A rather close view of the *Kako* was had from ahead, and it was noted that there are no breaks in the side plating, which was perfectly smooth from gun deck to water line, showing no signs of side armor.

10,000-ton class cruisers

While at the Kure Navy Yard the *Nachi* was seen undergoing construction in dry dock. The point of observation was some distance ahead of the *Nachi*, and from this position nothing could be determined of her general characteristics. The *Nachi* is in the early stages of construction, the side plating being not yet completed as high as the main deck and the stem not yet in place.

"This class of cruiser is to be equipped with two-gun turrets."

"Yubari"

Light cruiser, of 3,100 tons displacement, completed in July, 1923. Plans for cruisers of this class were drawn up prior to the

Washington conference, and this vessel had apparently progressed beyond the feasible point of alteration. No others of this class are being built or proposed. She is used to a great extent as a destroyer leader. Several interesting features of construction and gun installation are embodied, which are clearly shown in the photograph recently taken. The details are: Length (B. P.) 435 feet; breadth 39 feet 6 inches; draft, 11 feet 9 inches; speed, 33 knots; guns, six 5.5-inch (.50 cal.); two 3-inch (A. A.); torpedoes, four 21-inch, above water; mines, about 40, carried on two deck tracks.

Mine sweeper "No. 3"

Four vessels of this class have been completed and two more ordered. They are fitted with deck tracks for mine laying as well as sweeping.

The details are: Length, 235 feet; breadth, 26 feet 4 inches; draft, 7 feet 6 inches; displacement, 700 tons; speed, 20 knots; guns, two 4.7-inch, one 3-inch (A. A.).

[From the Japanese press]

Repairs to turbines of the cruiser "Kiso" completed

The turbines of the cruiser *Kiso* were reconstructed at the Kure Naval Station and the first high-speed endurance run was made on November 11. The trial was successful and a second trial will be held at a later date.

Owing to the frequent breakdowns in the turbines of light cruisers and destroyers, an investigation was made to determine the cause, and resulted in the discovery of the fault. Improvements were made on the *Kiso*, with the above satisfactory result.

Destroyer "Tanikaze" collides with steamer

On midnight of November 18 the destroyer *Tanikaze*, which was proceeding to Kure Naval Station, collided with the steamer *Ryuho Maru*, which was at anchor off Rokuren-To, near Moji, and the latter sank. There was no loss of life.

The *Tanikaze* was damaged in the bow and proceeded to Kure under her own power.

Destroyer "Ariake" sold

The destroyer *Ariake* (380 tons) was sold to the Tokyo marine harbor police and will be used as a guard ship at the entrance of Tokyo Harbor.

LIGHT CRUISER YUBARI

MINE SWEEPER NO 3

JAPAN

NOTES ON SUBMARINES

During a recent visit made to the Mitsubishi and Kawasaki dock yards, Kobe, and the submarine base, Kure, the following submarine information was obtained:

"I–51" (1,400 TONS)

"This is an experimental type, having a peculiar pressure hull design, as shown by sketch No. 1."

"This submarine is equipped with four 1,300-horsepower Sulzer engines."

"No other submarines of this type are to be built."

"The I–51 is of double-hull construction well forward and well aft only."

"I–52," "I–53," "I–54," "I–55," "I–58" (1,400 TONS)

"Fleet type submarines. Contract speed, 21 knots. Two 3,000-horsepower, two-cycle single-acting Sulzer engines. Double-hull design. No armor."

"One 500-horsepower charging engine. Low submerged speed. Storage battery capacity sacrificed for surface speed." It is believed that the present approved building program calls for 13 submarines of this tonnage, consisting of 12 fleet submarines of the *I–52 class* and the experimental *I–51*.

"I–1," "I–2," "I–3" (1,970 TONS)

Cruiser type appearance. Two 12-centimeter guns. Net-cutting device on bow. No airplane stowage. Two housing periscopes. Two folding radio masts on starboard side. Moderate size chariot bridge.

"Speed 17–18 knots. Long surface radius cruiser type. Two 3,000-horsepower Sulzer two-cycle single-acting engines, one 500-horsepower charging engine. Large battery capacity. Double-hull design. No armor.

There are now three of this type of submarine building at Kawasaki, Kobe. All three have been launched. It is believed that the present approved building program calls for one more submarine of this type.

Sketch No. 2 shows the general appearance of this type submarine. The bow planes are housed just above the bow tubes and swing out from forward aft. The folding masts are made of tapered steel sections, the top section being the smallest in diameter.

"I–21," "I–22," "I–23" (1,000 TONS)

None of this class has been launched as yet. The mines are discharged from the stern by means of two tubes horizontally arranged. It is believed that the present approved building program calls for three more submarines of this type.

"RO–31" (665 TONS)

This submarine is being rebuilt by the Kawasaki Dockyard Co., Kobe, and is now on the ways.

"RO–65," "RO–67" (998 TONS)

These two submarines are being built at the Mitsubishi Dockyard Co., Kobe. The *Ro–65* has been launched. The *Ro–67* is still on the building ways.

"Double-hull type. Speed about 14 knots surface. Engines, two 1,200-horsepower Vickers solid fuel injection type. (No air compressors.) Manufactured by the Mitsubishi Internal Combustion Engine Co. plant at Kobe. No armor."

"RO–14," "RO–15," "RO–16," "RO–17," "RO–18," "RO–19" (740 TONS)

These submarines are the school submarines used by the submarine school at Kure.

"They are double hull Japanese Navy type."

Equipment as follows: V tube on deck forward, two folding radio masts, loop antannæ, clearing wires, 3-inch antiaircraft gun on deck just forward of bridge, chariot bridge, two housing periscopes, telescopic signal mast at after end of bridge. These six submarines are similar in external appearance, except the *Ro–19*, whose forward part of bridge is similar to that of *I–51*.

GENERAL

"Mitsubishi Internal Combustion Engine Co., Kobe, manufactures only one type Diesel engine—the Vickers."

"No submarine Diesels are manufactured by Kure Navy Yard."

"Nineteen Japanese submarines are equipped with the 1,300-horsepower Sulzer engine."

NOTE.—The information contained in the sentences quoted above was mainly supplied by the competent escorting officer. It is believed to be correct. Sentences not quoted ascertained by observation.

[From the Japanese press]

Plan for raising a sunken submarine

The process consists in applying the well-bucket principle. The salvage ship is equipped with two pulleys, one on each side of the

ship. One end of a steel hawser is hooked on to the sunken submarine and the other end of the hawser is secured to a superannuated submarine which will be let down to the bottom gradually by letting the sea water in. As the superannuated submarine sinks the first submarine will gradually come to the surface.

To meet the need, each of the submarines has to be equipped with hooks in several places of the hull, called "Yamataka pins." When a submarine sinks buoys will automatically come to the surface, indicating the position of the sunken submarine. Hawsers with hooks on the ends are let down from the salvage ship along the lines of the floating buoys and these hooks will automatically hook on to the pins and the hauling operation will begin. Three successful trials were made with this process at a depth of 25 fathoms off Yokosuka, and on each occasion the sunken submarine was hauled up in about eight hours.

The salvage equipment costs about ¥200,000, and the navy desires to have five ships so equipped; attach one ship to each naval station.

Curb on submarine favored by Japan

The Japanese Navy considers that the restriction of submarine attacks to war-service ships only is better than the total abolition of submarines, a responsible spokesman for the Ministry of the Navy informed the Japan Advertiser yesterday.

Since Japan regards the submarine primarily as a weapon of defense, although it can be used to some extent in offensive warfare also, and since it forms an important unit in the existing defense scheme of the Empire, Mr. Percy McKinnon's proposal for its scrapping is regarded with disfavor, it was stated.

"The present agitation in England and elsewhere," said the naval official, "is apparently based on the assumption that the submarine is valueless except for attacking merchantmen. We do not concur in this view, but consider it a legitimate weapon of warfare if its use is properly controlled." A submarine, it was pointed out, is in effect a floating mine, and even unrestricted submarine warfare is less horrible and disastrous than the use of poison gas. Moreover, the comparative cheapness of the submarine enhances its popularity with a nation like Japan.

The spokesman of the Ministry of the Navy directed attention to the speech of Hanihara at the Washington conference on this subject, adding that it accurately represents the navy's views, just as it did when first delivered.

While it is realized that the Washington conference only made a beginning in the limitation of armaments and left much work un-

done, this important problem should not be tackled piecemeal, with submarines first and something else next, it is thought. The whole problem is a complicated and interlocking one.

The Japanese Navy favors a second disarmament conference, it was stated, if plans can be worked out to make it practical. The navy spokesman said that the ministry had no views to express regarding the holding of an arms limitation conference in Tokyo, since this proposal has not yet assumed either definite or official form.

Note on Submarine Base, Kure Navy Yard

The school is located on the end of the point to the northward of the navy yard. At the time of visit the instructing personnel consisted of 26 officers.

No officer students were at the school, the last class having recently graduated, but shortly a new class is to be formed consisting of 8 deck officers and 7 engineer officers.

Men under instruction consisted of 130 deck ratings and 120 engineer ratings.

School submarines are the 740-ton class, *Ro–14* to *Ro–19*. These were anchored off the sea wall.

The engine instruction shop contained one 300-horsepower two-cycle engine of German make, name unknown, and parts of a 1,300-horsepower Sulzer engine.

The torpedo instruction shop is a small reinforced concrete building near the north sea wall. It contained about twenty 18-inch torpedoes and the usual torpedo shop equipment for overhauling and testing torpedoes.

JAPAN

MISCELLANEOUS NOTES

Naval personnel

(Supplementing the data given on pp. 51–52 of December BULLETIN)

The following additional information on naval personnel has been received:

(1)	Midshipmen	651
(2)	Cadets	491
(3)	Students in outside schools	102
(4)	Civilians performing duty for the navy	1,392
(5)	Total officers on shore duty	3,088
	Total officers on sea duty	4,053
(6)	Total men on shore duty	18,300
	Total men on sea duty	46,995

NOTE.—Comparing the totals of officers and men as shown above with the total of officers and men as previously given it will be noted that there is a difference of 2 officers and 117 men, although the above information is also supposed to be as of September 1, 1925.

[From the Japanese press]

One thousand five hundred and sixty men conscripted from the Kure naval district; 1,687 men complete period of training

One thousand five hundred and sixty men were conscripted from the Kure naval district and will be admitted into the Kure naval barracks on December 1, 1925. (Kure naval district covers 2 fu and 15 prefectures.)

One thousand six hundred and eighty-seven naval volunteers of the Yokosuka naval district (located at Maidzuru) completed the course of instruction and were rated seamen third class and stokers and will be returned to Yokosuka naval station for assignment to ships of the fleet. Eighty-five will be transferred to Kasumigaura naval air station.

Visit of training vessel to New Zealand

According to the New Zealand press, it is the intention of the Japanese Government to send the *Iwate*, a training ship of the Imperial Japanese Navy, to two New Zealand ports. The *Iwate* is due to arrive in Wellington on February 18, and remain there for five days, when it will proceed to Auckland, arriving on February 26, and sailing from New Zealand on March 3. The vessel will be under the command of Capt. Yuriichi Yedahara, and the announced object of the voyage is to furnish instruction to newly promoted midshipmen.

High naval officers to take course in seamanship

In order to train officers in higher seamanship, the training ship *Fuji* will take on board 6 officers from Kure, 7 from Yokosuka, and 6 from Sasebo, all of the rank of captain and commander, and for one week, beginning November 10, will be given instruction in the use of the gyrocompass. From the middle of January to the middle of February the *Fuji* will cruise around Hokkaido, and from the middle of March to the middle of April will cruise around Taiwan.

Completion of four "F–5" flying boats

Four new *F–5* flying boats built by the Hiro Navy Yard were flown to the Sasebo naval air station—two on November 13 and two on November 18. These machines are equipped with 400-horsepower Lorraine Dietrich motors, also built by the Hiro yard. Each of these machines carried a crew of seven men.

Airplane engine built by the Mitsubishi Internal Combustion Engine Co.

The engineers of the Mitsubishi Internal Combustion Engine Co. at Nagoya, after several years' efforts, recently succeeded in making a powerful motor for use in airplanes.

The motor is of 450 horsepower. During a recent test the motor was run for 50 hours and functioned perfectly, developing a maximum power of 513 horsepower. The rate of consumption of gasoline was 220 grams, as compared to 230 grams for the Napier Lion and 244 grams for the Hispano Suiza.

Motors heretofore built in Japan were invariably a copy of a foreign design, while the aforementioned motor is virtually a Japanese motor in every respect.

Hiro aviation station to become an independent station next year

Hiro naval aviation station, which is now a branch of the Sasebo naval station, will be made an independent naval aviation station from the next fiscal year. With this in view, a large hangar capable of housing from 50 to 60 machines will be built at Hiro, construction of which will begin from the next fiscal year.

Arrival of the first of the two Japanese airplanes at Berlin

The entrance to the flying field of Tempelhof-Berlin and the roofs of the buildings there are adorned with the flags of the German Republic and the city of Berlin. A crowd had been gathering around the field ever since the early morning. The Japanese ambassador, Mr. Honda, and nearly all the members of the Japanese colony were present as well as the chief of the air department, Herr Brandenburg; the chief of the Hungarian air department, General Vassel; Major Parseval; Major Tschudi; the director of the Union of the German Aeronautical Industry, Herr Tetens; and many other flyers, such as Steffen and Mackenthum, well known for their overland flights.

Notice had been given by cable that the flyers had left Königsberg at 8.15 o'clock. Another telegram arrived shortly after saying that one of the flyers had had to land almost immediately owing to motor trouble. The second airplane was expected in Berlin about midday.

About half an hour before that time the Japanese ambassador, his secretary, Mr. Ito, and several representatives of the press flew out

to meet the Japanese planes. The Tempelhof Field was a picture of movement and excitement. Planes landed and started all the time. Now and then the excitement would rise to the highest pitch because the crowd mistook one of the approaching traffic planes for the expected visitor. About 1 o'clock the German airplane returned without having sighted the Japanese. What could have happened?

The Japanese guests talked over the details of the flight. It was organized by the newspaper Asahi, which has an issue of 2,000,000 copies daily, with 40 airplanes for the distribution. The Asahi sent two of these around the world, promising a reward of 300,000 yen (600,000 marks) in case of a successful ending. The heir to the Japanese throne, who generally does not receive anyone but officers and noblemen, accorded an audience to the two flyers, thus giving evidence of the high importance attached by the Japanese nation to this flight.

Still no sign of the expected guests. Inquiries are telegraphed to Danzig, Putzig, Scheidemühl, and Bromberg, and all these places give the same answer: The Japanese airplane has not been seen anywhere.

It is nearly 3 o'clock. Suddenly the siren wails over the field. A plane appears over the horizon and soon it becomes possible to distinguish the unfamiliar construction which shows it to be the Japanese. The police can hardly hold back the crowd which surges toward the landing place with waving flags and shouts of "Hoch" and "Bansai." The flyers can hardly push their way through the crowd of guests, film operators, and photographers.

The lateness of their arrival was due to trouble in the radiator which obliged them to make a landing about 200 kilometers from Berlin. They had spent several hours in repairing their engine sufficiently to be able to resume their flight.

Lunch and champagne were served in the open, accompanied by numerous presents of wreaths and flowers. Doctor Davidoff, of the German-Russian Air Traffic Co., and Doctor von Raumer, of the Aero Lloyd, both made short speeches expressing the hope that this flight might herald the establishment of air communication between Japan, Germany, and Russia. The Japanese military attaché, Mr. Watanabe, gratefully acknowledged the friendly reception and called the health of the Emperor of Japan, of the German nation, and of the Asahi press, to whose generosity the flight is due. All present rose to their feet while the Japanese sung their national hymn.

An endless stream of motors adorned with Japanese and German flags carried the guests to the Japanese Club, where they continued to celebrate the first Japanese-German flight in a less official manner.

Building program

The Minister of Marine, when interviewed on the subject of the building program, said as follows: "The new building program was prepared last year, at which time it was desired to have it approved, but the financial condition of the Government at that time being decidedly bad we were obliged to postpone its presentation until this year. The program involves an expenditure of ¥325,000,000. Due to financial conditions, we are forced to yield to an appropriation of ¥8,000,000 as next year's proportionment, or a total of ¥26,000,000 for three years. The ¥8,000,000 covers the construction of ships to be started next year.

"The original plan for next year called for four destroyers and one river gunboat, but this has been changed to the construction of four destroyers only. As to the original plan and what has become of it, since it is difficult to have the budget approved in its entirety at this time, due to the difficulty of definitely determining the future of the national finances to decide whether or not the country can safely make such continuing expenditures, it has been decided that this question will again be taken up next year when the budget for the fiscal year 1927–28 comes up for discussion, at which time the budget for the rest of the ships called for in the original program will be approved, provided of course the financial condition of the country at that time and the prospects for the future permit it.

"This agreement is not in such a vague form as 'is approved in principle,' etc., but is, as stated above, it is a decided fact that by the time above-mentioned the budget will be definitely settled and the program will be actually carried out."

NOTE.—It is significant that the 1926–27 allotment of the original ¥325,000,000 program has been actually approved by the Government in its entirety except for one gunboat.

[Source reliable]

Navy fuel depot, Tokuyama

PERSONNEL

Twenty naval officers, 800 civilian workmen; fuel depot is commanded by a vice admiral.

EQUIPMENT

Two refineries.—One refinery uses the asphalt method and the other the topping method. Capacity of refineries, 250 tons fuel oil each per day.

Four briquette factories.—Two of these factories make egg-shaped briquettes and two brick-shaped briquettes. Each of these factories

is equipped with three briquette-forming machines. Total normal briquette capacity, 500 tons per day; total maximum capacity, 1,000 tons per day.

Small brick power plant containing one 110-volt, 1,350-ampere direct-current generator driven by a steam engine; one alternating-current generator driven by a small steam engine; one transformer; and 12 induction coils. Electric power used by fuel depot is ordinarily obtained from the near-by city of Tokuyama, the fuel depot power plant being used as a stand-by plant only.

Boiler house.—Contains five large water tube boilers. Two of these boilers are fitted for using powdered coal. These two boilers were fitted with a much larger firebox and combustion space than the other three boilers. It was said to be from 20 to 30 per cent more economical.

Experimental boiler plant.—A small brick building containing one boiler used for experimental work in connection with briquettes.

Fuel-oil tanks.—Fifty-two steel tanks of 7,000 tons capacity each; total storage capacity, 364,000 tons. For fire-extinguishing purposes a central pump is used to pump a foam-type fire-extinguishing liquid through piping direct to each tank.

Gasoline tanks.—Twelve steel tanks of about 1,000 tons capacity each.

Miscellaneous tanks.—About 15 small steel tanks and concrete tanks used in connection with operation of refineries.

Can-manufacturing plant.—Small brick building containing complete machinery for manufacturing five-gallon gasoline tins.

Box plant.—Small brick building containing equipment for making shipping boxes for the five-gallon gasoline tins.

Coal-washing plant.—Two buildings containing equipment necessary for washing the coal used for making briquettes.

Storerooms.—Four small brick buildings used for storage purposes

Piers.—One concrete pier piped for handling oil. One concrete pier for handling coal.

Small-boat harbors.—One small-boat harbor between the two concrete piers formed by stone breakwater for berthing small boats, oil barges, etc. One small-boat harbor to the south of concrete coal pier.

Coal storage.—Two hundred thousand tons briquettes, 100,000 tons mine coal.

Radio station.—The radio station was not seen, but there are two wooden antennæ masts each about 100 feet high. The radio station was said to be powerful enough to communicate direct with Tokyo, but was ordinarily used for communicating with ships that were approaching the fuel depot for discharging or receiving fuel.

Lightning rods.—Two lightning rods about 75 feet high located near oil-storage tanks for the purpose of grounding atmospheric electrical currents.

General remarks.—The coal used for making briquettes is imported from Korea. Briquettes are made in two sizes—brick-shape and egg-shape. Escorting officer stated that larger shaped briquettes required breaking up into small pieces before used in boilers, whereas the small egg-shaped briquettes could be used in their original form, but that a greater quantity of the larger briquettes could be stowed in a given bunker. The coal as received from the mine is thoroughly washed in water by machinery, is then dried and pressed into briquette shape, using pitch as a binder. The escorting officer stated that coal in briquette form contains heat value of 7,800 calories and that the refined Diesel and fuel oil from 19,000 to 20,000 B. t. u. Most of the coal delivered from the mines was said to cost ¥16 per ton.

No guns or defenses of any kind were seen at the station.

The product of the refineries consists of fuel oil, Diesel oil, airplane gas, ordinary gas, and kerosene. A considerable quantity of inferior quality oil was said to be sold to private concerns for use in motor boats and for lighting purposes.

Escorting officer stated that fuel ships came alongside the piers, but that battleships fueling from this station anchored off and were fueled from barges or lighters. The function of this fuel station is to supply fuel to the navy yard of Kure, Yokosuka, and Sasebo, and that navy vessels ordinarily obtained their fuel from these naval stations. Naval vessels only occasionally obtain fuel direct from this fuel station.

Present population of Tokuyama was said to be 20,000.

Escorting officer stated that the question of using powdered coal on board ship had been studied, but to date no satisfactory solution of the problem had been found.

All fuel oil used by the navy is a refined product; fuel oil is also imported from foreign countries.

Japanese activities in Lower California

The Mexican Industrial Development Co., represented by M. Kondo, of San Diego, has completed a pier and warehouse at Turtle Bay, Lower California. This pier, with the warehouse, is located about one-half mile from the extreme point of Cape Tortola. There is a good channel leading to the pier with about 20 feet of water. The chart from a survey by the U. S. S. *Ranger* in 1889 is not correct in regard to soundings in Turtle Bay.

It would appear that the amount of the fishing business of M. Kondo does not justify the expense of the pier and warehouse. In fact, it is reported that the fishing business of the Mexican Industrial Development Co. does not make expenses, but that the business continues and money for financing purposes seems to come from the Japanese Government.

It is reported that when the Mexican Industrial Development Co. seems to be hard up for money M. Kondo makes a trip to Japan and upon his return business is continued with the appearance that the financial end has been taken care of.

During the dull part of the fishing season many Japs come to Ensenada to live, probably brought there by the *Haruna Maru* and *Chichibu Maru*. They remain at Ensenada until the beginning of the tuna season, when they go out on Japanese fishing boats from United States ports. Thus, the boats of the M. Konda Fish Co. and the Uchimura Fish Co. are manned by Japs from Ensenada.

It is reported that a modern refrigerating plant is being installed in the new warehouse at Turtle Bay. This will take care of the daily catches in the vicinity of Turtle Bay, and will enable the *Chichibu Maru* and *Haruna Maru* to load quickly and thus avoid the usual long delays at Turtle Bay during the tuna season. In addition to the Mexican Industrial Development Co. there are the Uchimuro Co., managed by Uchimuro himself and the Ocean Industries Co., managed by Inami. The *Chichibu Maru* and the *Haruna Maru* are operated by this latter company. The greater part of the fish of the Mexican Industrial Development Co. and of the Uchimuro Co. are sold to the Ocean Industries Co. It is reported that the Ocean Industries is about to take over the fishing business of the Mexican Industrial Development Co.

There are a number of Japanese fishing camps located at various points along the coast of Lower California, especially in the vicinity of Turtle Bay, Todos, Santos Bay, and Magdalena Bay. There are several Japanese fish camps on Todas Santos Island and also one American camp, owned and operated by a San Diego company. There is strong competition in Mexico between the Japanese and American fish companies, and consequently the Japs spread much anti-American propaganda in Mexico, especially in Ensenada.

The Mexican Government gives the Japanese fishing industries certain concessions, but these concessions are not considered desirable by the American fishing companies. Effort is being made to obtain a copy of the concession. However, it is understood that its important features are:

(*a*) Reduction of duties.

(*b*) Importation of machine parts and factory parts, duty free.

(*c*) Granting free of taxation cannery and industry sites.

(*d*) Mexican Government reserves right to take over factories or industries at any time upon 60 days' notice.

(*e*) Eighty per cent of labor employed to be Mexican (this is not enforced).

(*f*) Forfeiture of industry if, in any case, a company makes appeal to its own Government for any cause whatsoever.

Announcement was made by the Ocean Industries Co. that it would make efforts to develop a water supply on the arid shores of Turtle Bay for its own use and for other fishing companies. The well-drilling machinery and 3,000 feet of casing have been shipped to Turtle Bay on the *Haruna Maru*. It is planned to bore several wells, and it is believed that water will be struck in sufficient quantity to supply all demands.

Observations on conditions in Japan

[Source reliable]

The few observations here drawn, touch upon only the more important points which were brought to my attention during a three months' visit in Japan recently.

International relations.—(*a*) *Russo-Japanese affairs.*—At present the Russian red flag waves over the soviet embassy at Tokyo and consulates in all ports of any importance. With the soviet officials, have come a surplus number of clerks and stenographers and in their wake several large soviet missions. The Japanese Government has received these with suspicion, surrounded them by police, and issued special instructions to their own people. They are visibly much opposed to and afraid of red influences getting a start.

The heralded great benefits of a treaty with Russia are now spoken of as a "pipe dream" by the Japanese.

In Manchuria the Japanese and Russians are vieing with each other in railroad and trade relations which are considerably affected by the present construction of the railway to the vicinity of Tsitsihar by the Chinese under Japanese inspiration.

Saghalien is reported by the Japanese as very disappointing in oil, and as yet they have a very poor working agreement with the Russians. Very little trade with Siberia has developed. The Japanese people, and army officers in particular, express a feeling that another war with Russia is certain to develop in the not distant future. In early October a high ranking official in Tokyo confessed to an American that the present efforts of Japan and Russia to make a treaty at Moscow seemed doomed to failure, and that the soviets did nothing but quibble, apparently being satisfied with things as they are, or not desiring to reach any further agreement at this time.

(*b*) *Chinese-Japanese relations.*—Japan was undoubtedly much disappointed at the anti-Japanese turn of affairs in China the past summer. The Government seemed, however, with this and the tax revision conference, to maintain a rather considerate and sane attitude toward China. Japan appears to wish to get on somehow with Great Britain and America in China, preserving her own superior position wherever she can. She apparently opposes the abolishment of extraterritoriality, but in spite of some immediate loss to herself financially, the latest reports received indicated she would sanction the increase of Chinese revenues to 7½ per cent. Of course she will always insist on her special position in Manchuria.

The alignment of Chinese leaders as it existed in October, 1925, with Feng, backed by soviet munitions, instructors, and influence, and Chang aided by the Japanese, has possibilities beyond developing a mere local Chinese war in the near future.

The Japanese papers all summer long gave much space (generally critical of China and America) to discussing the Federal Wireless Co. in China. Japanese officials seemed to be optomistic as to the early settlement of this long-drawn-out controversy.

(*c*) *American-Japanese relations.*—One is everywhere impressed with the idea that the Japanese Government is anxious to preserve friendly relations with America. The Japanese consuls and diplomats have apparently been directed to use their efforts in this direction. Unless there is a great political upheaval, the Japanese Government is likely to keep still on the immigration question for some years. The attitude seems to be clearly understood by leading Japanese, official and unofficial, that "we believe an injustice has been done and we believe that America will eventually recognize this injustice and correct it. The question is not up for discussion." The Japanese delegates to the conference in Honolulu in July came back preaching just this idea, but apparently with a far better understanding of the American side of the question.

More than ever it was noticed that a ripple in America may become a wave in Japan. Press reports on national defense, statements of our officials on Japan, etc., get an echo larger than the original report. Even to the report of the Japanese military attaché at Washington being hit by a golf ball and the killing of a poodle dog belonging to an American lady in Washington well known in Japan were given a front-page display in Tokyo papers. The American defense test of last year and the naval maneuvers of this year are now rarely mentioned in spite of the great fuss over them before they were carried out. The defense test of July 4 was commented on as a failure.

Internal political conditions in Japan.—The cabinet after the August storm settled down again for at least another few months.

It is predicted that it will fall—or, what is more likely, the Diet be dissolved before January 1, as the Kenseikai party is so much weaker than its two opponents combined. Premier Kato, as the champion of universal suffrage, and his cabinet will make a very strong appeal in a new election and may be continued in power with a favorable Diet. The present cabinet members, while closely tied up to certain large moneyed interests, form comparatively a very able cabinet. The next election will be the first opportunity for the universal male vote. It is predicted that there will be less graft by politicians at election and a labor or proletarian party seems to be in the making. Such a party is unlikely to elect more than 20 or 30 members of the Lower House for some years to come.

The Privy Council, in its reorganization following the death of its president in September, seems to have assumed more closely its intended constitutional rôle—that of legal adviser. Its new president and vice president are lawyers. Apparently its future power as a political dictative organ will be much curbed and hereafter it will be more strictly a legal body only.

Economic conditions.—Everywhere you hear of a financial depression. There is less spending money. Several hundred unsound banks and weaker companies have been squeezed out and the Government has ordered certain banks, notably the Bank of Taiwan (Formosa) and Bank of Chosen (Korea), to cut their dividends in two and get down to a solid basis. The big companies are sound and safe and in many cases quietly waiting for the unsound ones to get to such a plight that they can be eaten up. They say prices, now greatly inflated, will be cheaper in the spring. The Government seems anxious to keep the yen at about 42. There has been a little gold released, but not enough to affect the exchange much. Foreign trade continues brisk (except for the upset in China), with the unfavorable balance much less this year than last. As usual, silk is the great determining factor in trade and America of foremost importance. Germany's trade has been greatly stimulated in the past two years, drawing heavily from Great Britain and America in some lines, particularly machinery.

There has been a great increase in the number of Korean laborers in Japan and some increase in Chinese coolies. These are hated by the Japanese and may lead at any time to serious trouble. Japanese labor is still inefficient, and there are always too many men on the job, not only in private companies but in the Government railways, post offices, etc. Labor has a hateful attitude toward capital and is getting better organized. Such radicals as Ozaki openly predict great bloodshed and a revolution, necessitating a complete reorganization of capital and labor, if not the Government, in less than 10 years. To-day capital is often very selfish and overbearing, demand-

ing extremely long hours. Japan can not compete well with foreign labor in factories as she should. Her products in many cases are either inferior or too costly to make.

The question of using iron-sand and oil-shale rock are still much talked of, but little has been done. It is understood a real test plant is to be tried out in the iron-sand field in the next year or two.

Military conditions.—A large middle school (similar to our junior high school) was visited, where 1,350 boys were receiving military training under the new plan. The military training in the schools of middle, high, and university grade is well started, and in spite of opposition—most of which is in the newspapers—seems to be well received in general by the teachers and students. At present the training is generally for four hours per week, of which one hour is fencing. Rifles and equipment are supplied for the advanced classes only. Japanese leaders argue that this training is patterned after the American R. O. T. C., of which they give an exaggerated idea. Probably from 400,000 to 500,000 boys are receiving military training in schools. The chief incentive to the student is the hope that eventually conscript service may be cut to six months for those who take the 10 years' work, and that they may receive reserve commissions. The chief argument of the teacher is that Japanese students are getting too free and radical, and this military control is very necessary to offset and stabilize this dangerous trend.

A very thorough inquiry was made to ascertain if America was being held up in Army training as the future enemy with whom the Japan must fight. Two isolated cases were heard of. It is believed to be far from general. The Japanese soldier is being taught that he need fear no white man. He licked the Russian, and the Britisher and American are little, if any, better. However, there is much talk of another war with Russia.

The new arms such as tank, antiaircraft units, etc., are reported to have been started, and air service increases under way. A well-informed foreigner in Tokyo had this to say of Japanese air efficiency: "So long as the enlisted man in the Japanese air service has but 1 year 10 months and 20 days to serve that service will remain very poor indeed. The real backbone of the Japanese Army air service to-day is the 50 mechanics (civilian) assigned to each battalion (about 300 altogether). There are a few good officers and noncommissioned officers, but the efficient army air force is very small, and not capable of rapid expansion under present conditions. In comparison the Japanese naval air service is much better because the enlisted men serve for a minimum of four years."

Japanese Army and other officials made great efforts and went to a large expense to entertain and show General Connor's mission in June a good time while in Japan. They were unusually frank

and open. Nothing was seen of the Japanese Navy, but their maneuvers were reported much restricted, owing to lack of funds. The auxiliary building program, which has been somewhat delayed, is being pressed in the next Diet.

Miscellaneous.—Great changes are taking place in Japanese thought. Japan is much more occidentalized than a few years ago. The people are more independent. Foreign dress, food, and dwellings are much more in use. Experts are working to teach English in a more advanced and efficient manner, and the Japanese Department of Education is reducing the number of important Chinese characters in use in the schools. The best of American movies are shown to crowded houses, while strictly Japanese movies are much less patronized. In sports Japan is rapidly coming forward. The Chicago University baseball team recently found the teams of Keio, Waseda, and Meiji Universities her equal, and the number of fans at the games daily in Tokyo were as many as 30,000. Tennis remains increasingly popular, and Japanese women are openly playing and will before long figure in world tennis events. Golf is popular where it can be had. At the same time the popularity of fencing and wrestling have greatly declined.

While Yokohama still lies almost prostrate from the effects of the earthquake, Tokyo is going ahead with her rebuilding nearly completed and broader and better roads. A subway system is to be started next year. Automobiles can get to all points of importance in Japan, though yearly good roads are few.

Foreign books are widely read. The Japanese book "Will Japan Fight with America," undoubtedly based on information from the Japanese Navy Department, published in February, has had an extremely light sale and in fact could not be found in most of the big bookstores of Tokyo. This is quite a contrast to General Sato's book, "If Japan and America Fight," published just before the Washington conference, the sales of which were perhaps 100,000 or more. Bywater's new novel on the "War on the Pacific" was published (abbreviated) in the Kokumin Shimbun (newspaper of Tokyo) and in book form September 16. It was on sale in all bookstores. There were other books on Japanese-American relations in Japanese, but none have a large sale. A set of eight post cards showing the American fleet at grand maneuvers were displayed in frames at many stores. This is probably both for naval propaganda as well as commercial purposes.

A woman's movement is just beginning and may in 20 years lead to woman suffrage. Woman's position is already considerably improved over a few years ago.

The delegates returning to Japan from the Pacific conference at Honolulu (including Mr. Zunoto, just back from America) put out considerable in speech but very little in print on the results of the conference and its working. The three men whom I heard speak on this conference all spoke with a better understanding of America's point of view and approval of the present Japanese Government policy on American immigration. They openly deplored certain press reports in America as to Japan's arming for war.

In conclusion, I found conditions much more quiet than they were a few years ago, and every indication that for some years to come Japan-American relations will continue to be good. There appears to be no big immediate problem.

NETHERLANDS

OIL OBTAINED IN DUTCH EAST INDIES BY JAPAN

[Source reliable]

The following are the figures of oil purchases in the Dutch East Indies by the Japanese Navy for the past three years:

	Metric tons
1923 (after the earthquake)	202,000
1924	105,000
1925 (first five months)	105,000

All this is bought by the Japanese Navy from the Tarakan fields in Borneo and is shipped in navy tankers to storage tanks at a point somewhere between the Kure naval base and Shimonoseki. The monthly purchases average about 20,000 metric tons, and as the entire Tarakan fields produce between 80,000 and 85,000 metric tons per month the Japanese Navy purchases amount to about 25 per cent of the total output of this fuel-oil field.

These figures do not include the purchases of better-grade oil, i. e., benzine and kerosene, made by the Nippon Oil Co. from the Balikpapen fields just south of Tarakan. Exact figures of these purchases can not be had, but it is believed that while most of the better grades thus purchased are for domestic consumption some undoubtedly finds its way to the navy. There is also to be taken into account the purchases, both governmental and private, in British North Borneo, Sarawak, and in Singapore, where all the big companies have large storage tanks in the outlying islands.

While in Soerabaya the naval base there, or "Marine establishment," as the Dutch call it, was seen. They seemed very pleased at a visit and wanted to show us everything they had. While not a trained observer as regards naval matters, you may be interested in

a layman's impressions: The Dutch have a real naval base in Soerabaya and one which seemed to me to be complete in every respect. It is laid out with a view to possible expansion, as colonial finances permit, of an increase in defenses. The establishment has a new ferroconcrete submarine base 110 yards long, with a capacity of seven submarines; a plant for charging eight submarines simultaneously; one shipbuilding dock for small vessels up to 1,500 tons; an airplane base with two aerodromes housing about 25 planes; a radio station capable of communicating with any boat or station in the Dutch Indian possessions; machine shops; forges; casting plant, etc.; a floating dry dock and a plant for repairing torpedoes (there were at least 250 in the shop, all Vickers make, being overhauled by Dutch sailors), and a small establishment for filling mines and other forms of ammunition. Five thousand men are employed constantly; of these 200 are European, 400 half caste, and 4,400 natives, who, they say, are easily trained and competent to turn out excellent work. The Dutch seem to depend upon submarines and mines for defense. I understand that the latter are strewn all around the islands at strategic points. In fact, the laying and replacing of mines and patroling for smugglers seemed to be the principal occupations of the Dutch Navy.

I noticed that the greatest activity seemed to be in the submarine section, where the armament of some of the older types of subs was being increased by the installation of an 8.8 cannon.

RUMANIA

LAKE MANGALIA PROPOSED AS NAVAL BASE

[Source reliable]

From time to time during recent years the subject of creating a Rumanian naval base somewhere along the Black Sea coast in the proximity of Constantza has been considered. There are two natural lakes separated from the sea by a very narrow strip of sand in each instance, the one situated just north of Constantza and the other just south of Mangalia, a small roadstead town, 44 kilometers south of Constantza.

It would appear that the Rumanian Ministry of War has now practically decided upon the Lake of Mangalia, which eventually may serve also as a commercial port.

The town of Mangalia is situated 7 kilometers distant from the old southern frontier of Dobrodja and about 100 kilometers from the present Bulgarian border; there are 26 kilometers by the shortest route westward to the railroad connecting the main Bucharest-

Constantza line with Bazargic and Varna, Bulgaria. By sea, Mangalia is stated to be 21 maritime miles from Constantza.

As above mentioned, on the southern side of the town is situated the Lake of Mangalia. It is in reality a salt lake 10 kilometers long in the direction east-west; 16 meters deep in parts; high banks on all sides but the sea (east), which make it invisible from short distances north, south, and west.

This lake is separated from the sea by a sandy isthmus about 300 meters wide which forms the sea beach and over which runs the road connecting Mangalia and Baltic.

Traces are still to be seen of the breakwater constructed by the Genoese several centuries ago, protecting the mouth of the entrance to the lake, for at that time it was unquestionably used as a port.

If the present suggestion of creating a naval base is carried out, the immediate work would consist of constructing a breakwater at the channel's entrance and two quays in masonry forming the sides thereof. Dredging would naturally be required.

This lake offers an ideal position for receiving any fleet, there being sufficient length, width, and depth for the movement of any vessel. The high banks herein aforementioned could be easily fortified, while the western end of the lake would lend itself admirably to the construction of docks, shipyards, munitions depot, etc.

As it is understood from Rumanians that Rumania apparently has no waterworks specialists, the Government would issue tenders for the construction work to foreign countries.

RUSSIA

MILITARY NOTES

[From the press]

Military service in the Soviet Union

The Soviet Union has issued the final law for military service, by which all soviet citizens from 19 to 40 years of age are subject to military duty. A mixed system will be established combining a standing army with a militia. The age from 19 to 21 is devoted to military preparation. Active military service begins at 21 and lasts five years, of which practically only two to four (according to the class of arms) are really spent in active service, whereas the rest of the time the recruit is on leave and is only obliged to attend military exercises and maneuvres.

All men from 21 to 32 years of age belong to the reserve of the first levy; all those of 32–40 belong to the reserve of the second levy.

The soldiers of the reserve as well as the militia are summoned to military exercises and control meetings.

A one-year military volunteer service is established for those eligible for military service having a superior school education. The nonworking and therefore nonvoting population is not liable for military service, but is enrolled into working battalions, of which only a few are called out in peace time, the others being subject to a military tax. Women may serve in the army in peace time only as volunteers, whereas in time of war they are liable to certain special services. Those whom their religious convictions forbid to take part in war are freed from military service by special decision of the courts.

Soviet aeronautical progress

During the past few years the soviet military authorities have devoted much time and money to the development of aeronautics in the Union of Socialist Soviet Republics. They make no secret of their intention to create a powerful air fleet; indeed, they claim that the Red air fleet will ultimately be the most powerful in the world, capable of dealing with any probable combination of fleets which the capitalist world may oppose to them.

It would be a mistake to estimate the progress in soviet aviation on the basis of the extravagant speeches made by soviet politicians, as these are meant primarily to create enthusiasm at home and to impress sympathizers abroad, particularly in the east, with the power of the soviet fighting services. The official soviet construction and purchase program is also not a true guide, as this, like the majority of other soviet programs, has hitherto only partially been carried out. It must, however, be admitted that great progress has been made during the past year, not only in the acquisition of modern aircraft for the army and navy but also in the training of pilots and the equipment of aerodromes.

At the beginning of July, 1925, the Red air fleet had 987 airplanes and seaplanes on its active list. Of these 625 were listed as observation machines, 296 as fighting machines, and 66 as heavy bombers. They are organized in squadrons. A squadron has an establishment of 12 airplanes, including four reserve machines. The whole fleet in July numbered 98 squadrons, few of which were up to establishment. Most of these were stationed in European Russia (32 in the Ukraine, 17 in the Caucasus and vicinity, 17 in the Province of Moscow, 9 in the Leningrad military district, and 5 in the Volga district). The total number of registered airmen throughout Soviet Russia in July was 1,214 (784 pilots and 430 observers). Some of these are at present not attached to the army, a few are in the em-

ployment of foreigners (chiefly German) in soviet territory, but all are liable to military service when called upon.

Great strides have been made in the provision of accommodation for airplanes. The so-called Association of Friends of the Red Air Fleet has, through its local branches, constructed 30 aerodromes in different parts of soviet territory, and the army authorities have since the spring built nine entirely new military aerodromes in the vicinity of what they consider probable "fronts" in European Russia. These are furnished with the most modern equipment.

During the present year soviet seaplanes have for the first time been organized into a real fighting force. At present there are 12 squadrons for service in the Baltic. These squadrons are much below establishment, the total strength of aircraft being about 60. There are about 100 seaplanes stationed in the Black Sea, 65 of which are of the latest types. Squadrons for use in the Caspian Sea and the Pacific Ocean are in process of organization. At present there are about 20 seaplanes on the far eastern coast, but during this autumn it is intended to station four squadrons in that area.

SPAIN

NAVAL NOTE

[From a confidential news agency]

Cancellation of contract with Krupps

An article in the above states: That a member of the Krupp Co. recently stated that Krupps had had an agreement to furnish plans and specifications for 24 submarines to be built in Spain for which Krupps were to receive a royalty of 36 million pesetas.

That, owing to recently passed tariff bills which cause friction between Spain and Germany, and, furthermore, in view of the more recent agitation for the abolishment of submarines, this contract had been canceled and announcement made by the Spanish authorities that nothing would be done toward building submarines for at least one year.

NOTE.—Of Spain's submarine program, 12 only remain to be begun.

SWEDEN

ORGANIZATION AND POLICIES OF AIR FORCES

Under provisions of the 1925 act, an act recently passed reorganizing defense forces of Sweden, the air service was established as

an independent branch in the Ministry of Defense on par with the army and the navy.

The 1914 act covering the defense forces of Sweden was passed with the condition that it would be effective for 10 years. In consequence the Minister of Defense prepared a bill in February, 1924, for a new organization. In this draft the provisions were made to form the air service in such a manner that it would have a chief, a central board for the consideration of technical and economical questions of which the chief of air service was to have been the chairman, and an army aviation service and a navy aviation service that were to be on the same footing as the various branches, such as cavalry, infantry, in the army, and such as torpedo and submarine divisions in the navy. This bill failed to pass.

The arguments relative to the foregoing bills are not all available. It may be stated that the chief of staff of the army subscribed to the 1924 bill, while the chief of staff for the navy objected to the 1924 bill only in so far as it prescribed a central organization for handling the technical and financial questions.

In the new act, that is, the new 1925 reorganization act, the chief of staff for the army, while objecting to the bill in general, recommended it solely for the reason that it gave the air service a much needed increase. The chief of staff for the army objects to this bill in many of its details and insisted on having an air service that was a subdivision of the army.

Some of the reasons for his objections are: That the air service is given too great a position in the defense organization at the expense of the other more important means of defense, and hence the defense of Sweden would rest on air forces; that the decisive struggles must take place on land; that no air forces exist to-day than can subjugate Sweden; that provisions should be made to place the air service under the army command office; that in many countries the air service is divided so that they form appropriate divisions within the army and the navy, which indicates the intimate cooperation that should exist between these combat forces; that the other forces are still the principal means of defense; that while experiences of other countries show certain reasons for a combined air service, the conditions are entirely too peculiar and too different in Sweden to permit direct adaptation of foreign plans; that it was agreed to accept the new act as it was given since no other alternative was provided.

The chief of staff for the navy also objects to the act as finally passed. Relative to the question of changing the status of the air service and the direction of this service within air defense organization, he said it was necessary for him to find fault with this act for the following principal reasons: The air service requirements,

whether this weapon operates as an independent arm or in conjunction with the land or naval forces, come within the land or naval forces' jurisdiction practically in all cases. And for the defense of cities, of other districts within the country, against air attack, the air service must be placed under the jurisdiction of the appropriate commander of the land or the sea defense forces charged with defense and protection of the places so attacked. Further, it is necessary that the air service personnel who cooperate with the army or the navy operations or carry on independent operations which are in their very nature either army or naval operations must be fully informed of the army or navy methods of operation; that such a thorough experience of this personnel within both of these divisions may never be acquired can certainly be taken as a foregone conclusion. For the missions of the navy flight formations must be organized from those belonging to the navy, and likewise for the missions of the army such formations must be organized from the army aviation. It is a duty incumbent on the chief of staff for the army and the chief of staff for the navy in time of peace, to make plans and, in time of war, to lead, under the high commander, the forces made available for defense and also to prepare plans partly for a temporary combination and use of the aviation forces of both the army and navy, which combined use may, under very exceptional conditions arise in cases that are outside the jurisdiction of the army as well as the navy authorities; partly for occasional strengthening of the army or navy air forces with formations belonging to the other. Continuing, he said:

"It also comes within the scope of this subject that the above-named chiefs should be responsible to the King for the organization, etc., in time of peace for those divisions of the air service which they will lead in war operations. For the reasons stated above, it is not deemed suitable to separate these operations in closely supported defense from the army or the navy or the independent operations of the army or the navy, and to permit a third branch to be established with a chief directly under the King, whose principal function will include situations that undeniably come within the jurisdiction of either the chief of general staff of the army or of the chief of general staff of the navy. Even if there should never come up any vital differences between these three chiefs, an organization as proposed can, acording to my understanding, serve to no good effective purpose in our defense department. The experiences in this question as learned from other countries during the most recent times corroborate my understanding. For this reason I must recommend that, according to my views, the navy should retain its own air service and that an aviation section should be established in the navy administration department. Since the air service of the army

and navy are combined, the viewpoints expressed above should at least be considered in establishing the staff for the air service."

According to the new organization an entirely independent air force is to be created, comprising both the army and navy. The chief of the air force will be directly under the King, who is in supreme command of the country's defense. At the disposal of the air force is a board of aeronautics, the purpose of which is to handle all matters pertaining to the general staff and the administration. The air force includes one school for aeronautics and four aviation corps, besides several manufacturing plants and service stations.

The personnel of the air force consists of 62 officers, 48 petty officers, 84 noncommissioned officers, and 92 privates.

In addition to the above the air force will have a certain personnel which is ordered for service from the army and navy.

The organization of the air force must be accomplished within five years.

TURKEY

REGULATIONS CONCERNING ENTRANCE AND VISIT OF FOREIGN NAVAL VESSELS IN TURKISH TERRITORIAL WATERS

ARTICLE I. No foreign warship, auxiliary transport, or naval vessel, governmental tenders and airplanes accompanying it, may enter Turkish ports or territorial waters without permission of the Government of the Turkish Republic obtained through diplomatic channels.

Foreign Governments requesting such a permit have to submit to the Government of the Turkish Republic through diplomatic channels *at least 10 days prior to the planned visit* of the warships and accompanying vessels a declaration containing a description of the warships or other vessels, their names, the name of their commanders, the number of their crew, and the extent and duration as well as the object of their visit.

ART. II. Foreign submarines are in no case permitted to navigate in Turkish territorial waters nor are they authorized to enter these waters submeged.

ART. III. The Government of the Turkish Republic reserves the right to determine and to limit the extent of stay, the number of warships and other vessels of the same foreign Government which may be permitted to enter Turkish territorial waters.

In case a prolongation of the visit is necessitated due to "force majeure," authorization must be requested from the Turkish Republic through diplomatic channels.

(*a*) Warships and auxiliary vessels carrying on board reigning sovereigns, presidents of republican States, and members of reigning dynasties; and

(*b*) Warships and auxiliary vessels compelled to enter Turkish ports on account of damage, danger, or some other unforeseen reason are exempt from the provisions of Articles I and III.

ART. IV. Foreign warships must hoist their flag as soon as they enter Turkish territorial waters and enter a zone from which signals may be seen.

ART. V. In all Turkish harbors where there is a naval commander or a captain of the port foreign warships will have to anchor at the place indicated by these officials. Longboats, steam or motor boats, and other means of maritime transportation attached to these vessels are not permitted to land in the harbor at any other place than that indicated.

ART. VI. The Turkish Government can in case it considers it as necessary inform the interested Governments regarding all authorizations previously accorded for the visit of foreign vessels in its territorial waters. Likewise these vessels are in case of invitation obliged to leave the harbor or to shift berth within a delay of six hours.

ART. VII. All officers and men of such naval vessels in Turkish waters, even with a special permit of the Government, are not allowed to circulate in the vicinity of fortifications, batteries, and military posts and establishments.

ART. VIII. Foreign warships in Turkish ports or territorial waters are not permitted to land troops, to fire in these ports or territorial waters any of the ships batteries (guns, rifles, torpedoes, and mines) or to hold target and searchlight practice.

ART. IX. It is strictly forbidden for anyone of the personnel of foreign warships to take pictures of the coast and ports of the Turkish Republic; to make plans; to take, reproduce, and publish the plans, sketches, and pictures of fortifications, batteries, and establishments attached to them within a zone of 10 kilometers; to take measurements and soundings; in short, to make without the authorization of the Government and with their own boats or any other means all kinds of hydrographic and topographic measurements; to install nautical signs; to proceed by means of airplanes to the reconnoissance of the coast and mainland; and to make maps.

ART. X. In case the foreign warships authorized to visit the Turkish ports and territorial waters of the Turkish Republic are accompanied by aerial forces these airplanes can not enter these mentioned ports or waters while flying.

ART. XI. The crew of foreign warships can go on shore only unarmed and for the purpose of shore leave.

In case, however, the commander of a vessel desires to land armed sailors for funeral processions, authorization must be obtained from the local authorities for the debarkation of a number of armed men, to be specified according to the importance of the ceremony.

The officers, however, can during official visits wear side arms which constitute a part of their uniform.

ART. XII. Warships belonging to different nations in Turkish ports or territorial waters must not assume toward each other a hostile attitude, arrest, search, or destroy a vessel.

ART. XIII. The commanders of foreign naval vessels must comply strictly with the laws and regulations of the Turkish Republic concerning public health, customs, wireless telegraphy, harbor rules, and regulations.

ART. XIV. In case the commanders of foreign naval vessels fail to comply with the provisions of these regulations, the local military and naval authorities will call the attention of the commanding officer to the matter and invite him to conform with the regulation. If this step remains resultless the above-mentioned Turkish military and naval commanders will invite the vessel to leave the port or territorial waters immediately.

ART. XV. In case of a danger of war or a declaration of war the Turkish Republic reserves the right to accept or to refuse foreign naval vessels in its ports or territorial waters and to have recourse to all sorts of precautionary measures and even establish certain local regulations.

ART. XVI. For the zone of the straits the provisions of the Lausanne treaty of July 24, 1923, will be fully respected.

NAVAL BASES

ART. XVII. As it is specified in Article I of these regulations, the entrance of all foreign warships or other vessels into the naval ports which have been or will be indicated to the foreign states by the Turkish Republic, in accordance with the prevailing usage, underlies the conditions enumerated in Article I. On the other hand, their entrance to or exit from these naval ports is only permitted between sunrise and sunset.

ART. XVIII. Except the warships and auxiliary vessels indicated in paragraphs (*a*) and (*b*) of Article III, all foreign warships and auxiliary vessels, military airplanes, and balloons by which they are accompanied will be hindered in case they try to enter naval ports without obtaining a special permit.

UNITED STATES
TREATY NAVIES

[Prepared by O. N. I.]

Information as of October 1, 1925

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Data regarding ships affected by treaty

A.—COMPLETED—CAPITAL SHIPS ALLOWED TO BE RETAINED

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
B.B. Battleships, first line	18	525,850	18	457,750	6	191,320	6	138,768	5	108,360
O.B.B. Battleships, second line	0		0		0		3	55,776	2	25,310
C.C. Battle cruisers, first line	0		4	122,700	4	110,000	0		0	
Total	18	525,850	22	580,450	10	301,320	9	194,544	7	133,670

B.—BUILDING—CAPITAL SHIPS ALLOWED TO BE COMPLETED

B.B. Battleships, first line	0	(1)	2	[2] 70,000	0		0		0	

C.—STATUS IN CAPITAL SHIPS WHEN SHIPS IN "B" ARE COMPLETED

Capital ships armed with 12" guns	0									
	4	95,650	0		0		6	125,160	7	133,670
Capital ships armed with 13.4" or heavier	14	430,200	20	558,950	10	301,320	3	69,384	0	
Total	18	525,850	20	558,950	10	301,320	9	194,544	7	133,670

D.—AIRCRAFT CARRIERS—COMPLETED—ALL EXPERIMENTAL AND CAN BE REPLACED EXCEPT FURIOUS

C.V. Aircraft carriers, first line	0		2	[3] 41,890	0		0		0	
O.C.V. Aircraft carriers, first line	1	12,700	2	25,400	1	9,500	0		0	
Total	1	12,700	4	[3] 67,290	1	9,500	0		0	
Tonnage allowed under treaty		135,000		135,000		81,000	0	60,000		60,000

E.—AIRCRAFT CARRIERS—BUILDING

C.V. Aircraft carriers, first line	2	[4] 66,000	2	[5] 37,200	2	[6] 53,800	1	[7] 21,160	0	
O.C.V. Aircraft carriers, second line	0		0		0		0		0	

[1] United States was allowed to complete the West Virginia and Colorado. Both completed in 1923.
[2] Nelson and Rodney laid down December, 1922, when completed will replace Ajax, Centurion, King George V., and Thunderer.
[3] Includes Furious, tonnage 19,100, completed September, 1925.
[4] Lexington and Saratoga, which were building as battle cruisers, are to be completed as aircraft carriers. Treaty tonnage.
[5] Courageous and Glorious.
[6] Akagi, formerly building as battle cruiser: Kaga, formerly building as battleship.
[7] The Bearn, ex-battleship.

Data regarding ships affected by treaty—Continued

F.—SHIPS—COMPLETED—WHICH HAVE BEEN SCRAPPED BY TREATY

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
B.B. Battleships, first line	2	[8] 40,000	7	158,000	1	20,800	0	----------	0	----------
O.B.B. Battleships, second line	17	249,580	9	164,950	8	129,001	0	----------	0	----------
C.C. Battle cruisers, first line	0	----------	2	52,700	0	----------	0	----------	0	----------
O.C.C. Battle cruisers, second line	0	----------	4	72,100	0	----------	0	----------	0	----------
O.C.A. Cruisers, second line	0	----------	0	----------	3	42,950	0	----------	0	----------
Total	19	[9] 289,580	22	[10] 447,750	12	[11] 192,751	0	----------	0	----------

G.—SHIPS WHICH WERE UNDER CONSTRUCTION AND WHICH HAVE BEEN SCRAPPED BY TREATY

B.B. Battleships, first line	7	291,800	0	----------	2	[12] 79,958	0	----------	0	----------
C.C. Battle cruisers, first line	6	[13] 261,000	0	([12])	2	[14] 82,000	0	----------	0	----------
Total	13	[13] 552,800	0	----------	4	161,958	0	----------	0	----------

[8] Delaware and North Dakota scrapped upon completion of Colorado and West Virginia.
[9] Includes Oregon and Illinois.
[10] Includes Collingwood and Colossus.
[11] Includes Asahi and Shikishima.
These ships permitted to be retained for noncombatant purposes after complying with Part 2, III, (B) of treaty.
[12] Four ships projected, not laid down.
[13] Includes battle cruisers Lexington and Saratoga, which are being completed as aircraft carriers. (See Table "E" above.)
[14] Six ships projected.

Data regarding modern combatant ships whose numbers are not affected by the treaty

A.—SHIPS—COMPLETED

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
B. M. Monitors, first line (14" guns+; 6,000 tons+)	0	----------	3	22,670	0	----------	0	----------	0	----------
C. A. Cruisers, first line (12" guns+; 10,000 tons+; 27 knots+)	0	----------	0	----------	0	----------	0	----------	0	----------
C. L. Light cruisers, first line 5"-8" guns; 3,000-10,000 tons; 27 knots+)	10	75,000	38	179,190	16	82,210	3	16,734	8	30,784
D. L. Destroyer leaders (4" guns+; 1,500 tons+ 27 knots+)	0	----------	18	31,310	0	----------	1	2,067	8	14,889
D. D. Destroyers, first line (4" guns+; 800-1,500 tons; 27 knots+)	267	318,010	183	209,265	72	77,025	19	18,628	19	17,087
D. M. Light mine layers (5" guns-; 3,000 tons-; 27 knots+)	14	16,674	0	----------	0	----------	0	----------	3	1,752
S. S. Submarines, first line (3" guns+; 700 tons+; 13 knots+)	50	43,822	26	23,560	41	32,838	15	12,993	10	7,902
S. F. Fleet submarines, first line (3" guns+; 1,000 tons+; 20 knots+)	5	[1] 7,556	8	16,460	2	2,800	0	----------	0	----------
S. B. Monitor submarines (6" guns+; 1,000 tons+; 12 knots+)	0	----------	3	4,800	0	----------	0	----------	0	----------
S. M. Mine-laying submarines, first line (3" guns+; 800 tons+; 10 knots+)	0	----------	3	2,670	0	----------	3	2,988	0	----------

[1] Includes tonnage of T-1, T-2, and T-3. Out of commission.

Data regarding modern combatant ships whose numbers are not affected by the treaty—Continued

B.—SHIPS BUILDING—NO TREATY LIMIT ON NUMBERS THAT CAN BE BUILT

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No	Tons	No.	Tons	No.	Tons	No.	Tons
C. L. Light cruisers, first line (5"-8" guns; 3,000-10,000 tons; 27 knots+)	0	.....	9	[2] 85,100	9	73,995	5	43,619	2	20,000
C. M. Mine layers, first line (8" guns—; 3,000-10,000 tons; 27 knots+)	0	.....	1	7,260	0	.....	0	.....	0	.....
D. L. Destroyer leaders (4" guns+; 1,500 tons+; 27 knots+)	0	.....	0	.....	0	.....	6	14,154	0	.....
D. D. Destroyers, first line (4" guns+; 800-1,500 tons; 27 knots+)	0	(3)	2	2,700	9	[4] 12,960	18	26,034	16	20,136
D. M. Light mine layers (5" guns—; 3,000 tons—; 27 knots+)	0	.....	0	.....	0	.....	0	.....	9	[5] 6,486
S. S. Submarines, first line (3" guns+; 700 tons+; 13 knots+)	0	(6)	2	1,780	4	3,659	11	13,281	8	6,340
O. S. S. Submarines, second line (3" guns—; 700 tons—; 10 knots+)	0	.....	0	.....	0	.....	12	7,080	0	.....
S. F. Fleet submarines, first line (3" guns+; 1,000 tons+; 20 knots+)	1	[7] 2,119	1	1,480	7	[8] 11,510	0	.....	4	5,200
S. C. Cruiser submarines (4" guns+; 2,000 tons+; 16 knots+)	2	.....	0	.....	0	.....	0	.....	0	.....
S. M. Mine-laying submarine, first line (3" guns+; 800 tons+; 10 knots+)	1	.....	0	.....	3	3,000	0	(9)	0	.....
Total number of units and tonnage	4	[10] 2,119	15	98,320	32	105,124	52	104,168	39	58,162

C.—DATA REGARDING OBSOLESCENT OR OBSOLETE VESSELS STILL RETAINED AND OF PATROL VESSELS, ETC.

O. B. M. Monitors, second line (12" guns—; 6,000 tons—)	0	.....	2	11,600	0	.....	0	.....	0	.....
O. C. A. Cruisers, second line (8" guns+; 8,000 tons+; 27 knots—)	11	139,450	0	.....	7	64,098	11	127,486	3	31,228
O. C. L. Light cruisers, second line (8" guns—; 3,000-8,000 tons; 27 knots—)[11]	11	39,975	12	64,580	6	27,362	2	8,021	2	6,274
O. C. M. Mine layers, second line (8" guns—; 3,000 tons+; 27 knots—)	4	16,096	1	5,070	3	19,685	0	.....	0	.....
O. D. D. Destroyers, second line (4" guns—; 500-800 tons; 25 knots+)	8	5,936	6	4,200	12	7,850	28	19,894	31	23,312

[2] Includes two 10,000-ton cruisers appropriated for by Australia.
[3] Twelve authorized but no funds appropriated.
[4] In addition, eleven 1,445-ton destroyers have been authorized and appropriated for and some have been contracted for, but so far as is known none have been laid down.
[5] To be combined mine layers and mine sweepers.
[6] One S. S. authorized but no funds appropriated.
[7] Three additional boats authorized but no funds appropriated.
[8] Eleven authorized and appropriated for but not known to be under construction. Total tonnage of these 11 boats is 14,770.
[9] Two of 3,000 tons each authorized to be laid down in 1925.
[10] Does not include tonnage of mine-laying submarine and two cruiser submarines.
[11] If all light cruisers, first and second line, completed since Jan. 1, 1912, and those now building or authorized are considered, the figures are as follows: United States, 12, of 95,000 tons; British Empire, 61, of 358,370 tons; Japan, 28, of 171,055 tons; France, 10, of 73,748 tons; Italy, 12, of 57,058 tons.

Data regarding modern combatant ships whose numbers are not affected by the treaty—Continued

C.—DATA REGARDING OBSOLESCENT OR OBSOLETE VESSELS STILL RETAINED AND OF PATROL VESSELS, ETC.—Continued

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
O. S. S. Submarines, second line (3" guns—; 700 tons—; 10 knots+)	65	31,282	25	10,808	10	3,259	24	10,339	31	8,761
O. S. F. Fleet submarines, second line (3" guns; 1,000 tons+; 20 knots—)	0	----------	1	1,200	0	----------	1	2,027	0	----------
O. S. M. Mine-laying submarines, second line (3" guns; 800 tons—; 8 knots+)	0	----------	0	----------	0	----------	3	1,658	2	794
P. G. Gunboats and patrol vessels (3" guns+; 500–3,000 tons; 20 knots—)	5	6,587	62	64,031	7	8,883	56	44,666	5	6,725
River gunboats	4	993	18	8,665	7	1,908	0	----------	0	----------
P. Y. Converted yachts	8	9,127	3	10,515	0	----------	3	2,170	5	16,132
P. E. Patrol vessels (4"–3" guns; 100–500 tons; 14 knots+)	53	26,500	59	[12] 15,091	25	[13] 9,525	70	15,713	98	20,496
P. C. Patrol vessels under 100 tons	35	2,695	37	718	3	[14] 34	54	3,790	288	7,428
A. M. Mine sweepers	44	41,800	65	49,968	22	[15] 9,657	29	10,310	39	[16]
A.—PATROL VESSELS, ETC., BUILDING										
A. M. Mine sweepers	0	----------	0	----------	2	1,400	0	----------	0	----------
P. C. Patrol vessels	0	----------	[17] 2	----------	0	----------	0	----------	8	168
B.—AUXILIARIES COMPLETED										
A. C. Colliers	5	96,140	1	[18] 9,700	0	----------	1	2,304	0	----------
A. D. Destroyer tenders	9	101,900	7	51,080	0	----------	0	----------	0	----------
A. E. Ammunitions ships	2	21,200	0	----------	0	----------	0	----------	0	----------
A. F. Refrigerator and store ships	5	61,500	0	----------	1	17,500	10	4,965	4	4,556
A. H. Hospital ships	3	25,817	1	10,100	0	----------	3	16,905	0	----------
A. K. Cargo ships	7	64,245	7	7,512	4	31,789	0	----------	0	----------
A. O. Oil tankers	19	264,696	66	504,884	14	196,950	9	68,860	8	52,250
A. P. Transports	2	23,400	0	----------	0	----------	3	6,060	4	29,953
A. R. Repair ships	3	26,200	1	9,600	1	2,270	2	16,231	0	----------
A. S. Submarine tenders	8	57,843	10	49,471	11	44,828	0	----------	2	4,724
A. T. Tugs (seagoing, over 500 tons)	37	32,625	41	30,734	37	[19]	29	20,860	4	4,418
A. V. Heavier-than-air aircraft tenders	1	11,500	2	10,150	1	5,875	0	----------	0	----------
A. Z. Lighter-than-air aircraft tenders	1	16,800	0	----------	0	----------	0	----------	0	----------
Surveying ships (auxiliaries and miscellaneous)	1	4,000	10	11,210	3	5,554	9	5,144	5	3,795
A. G. Auxiliaries, miscellaneous	5	[20] 41,245	6	[21] 5,801	6	[22] 5,543	2	19,041	1	7,232

[12] Trawlers and drifters.
[13] There are in addition 29 old torpedo boats, from 100 to 381 tons, built between 1899 to 1904. Eighteen of these boats have been converted into mine sweepers, 2 are in commission as torpedo boats, 9 are out of commission, and 4 of these 9 are to be sold.
[14] Five additional motor boats. No details.
[15] There are 35 additional small vessels. No details known. Probably similar to tugs. Also 22 small mine sweepers. All sweepers are fitted so that they may be used as mine layers.
[16] Small vessels.
[17] Two CMB's, 55 feet.
[18] Other colliers are time chartered.
[19] Small tugs, details unknown, 100–350 tons. Assigned to various naval stations.
[20] In addition, the North Dakota, of 22,600 tons, retained under the treaty as target ship.
[21] In addition, the Agamemnon, of 16,000 tons, retained under the treaty as target ship.
[22] In addition, the Seytsu, of 20,800 tons, retained under the treaty as target ship.

Data regarding modern combatant ships whose numbers are not affected by the treaty Continued

C.—AUXILIARIES BUILDING

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
A. P. Transports	0	(a)	0	.....	0	.....	0	.....	0	.....
A. S. Submarine tenders	1	10,600	0	.....	0	.....	0	.....	0	.....
A. V. Heavier-than-air aircraft tenders	0	.....	0	.....	0	.....	0	.....	1	4,920
A. O. Oil tankers	0	.....	0	.....	0	.....	1	6,500	0	.....

[a] One vessel of 10,000 tons authorized, but appropriation for construction not provided.

A.—UNITED STATES

Type	No.	Tons	Speed	Guns			Torpedo tubes		Keel laid	Date of completion	Remarks
				Main	Secondary	Antiaircraft	Above water	Below water			
C. V. Aircraft carriers, first line.	2	[1] 66,000		8–8″: 55 cal.	4–6 pdr.				Lexington, June, 1921; Saratoga, September, 1920.	Indefinite	Lexington and Saratoga laid down as C. C.; now building as C. V.
S. F. Fleet submarines, first line.	1	2,119							October, 1921	February, 1926	V–3.
S. M. Mine-laying ubmarine, first line.	1									Indefinite	
S. C. Cruiser submarine	2									Indefinite	
A. S. Submarine tender	1	10,600	16.0	8–5″: 51 cal.	2–6 pdr.	4–3″: 50 cal.		1–21″	April, 1921	January, 1926	Holland.
Total number of units and tonnage.	[2] 7	[3] 78,719									

B.—BRITISH EMPIRE

B. B. Battleships, first line	2	70,000	21	9–16″	16–6″				December, 1922	1925, 1926	Rodney and Nelson.
C. L. Light cruisers, first line.	7	[4] 70,000		8″					1924, 1925	1927, 1928	Suffolk, Berwick, Cornwall, Kent, Cumberland and 2 Australian C. L's.
C. L. Light cruisers, first line.	2	15,100	33	7–6″	2 lt. and mg. 7–3 pdr.	3–4″	12 (4 triple)		August, 1918	1925	Emerald and Enterprise.
C. V. Aircraft carriers, first line.	2	37,200	31							Indefinite	Courageous and Glorious.
C. M. Mine layers, first line	1	[5] 7,260							November, 1922.	December, 1925	Adventure.
D. D. Destroyers, first line	2	2,700							1924	Indefinite	Amazon and Ambuscade.
S. S. Submarines, first line.	2	1,780	17.5	1–4″					January, 1918	1925	L–26 and L–27.
S. F. Fleet submarines, first line.	1	1,480	20						1924	Indefinite	0–1.
Total number of units and tonnage.	[6] 19	205,520									

[1] Treaty tonnage.
[2] In addition, 6 gunboats authorized and appropriated for but not as yet building.
[3] Does not include tonnage of one mine-laying submarine and two cruiser submarines.
[4] Includes two 10,000 cruisers building for Australia.
[5] Estimated.
[6] In addition, 2 patrol vessels of 55 feet building.

C.—JAPAN

Types	No.	Tons	Speed	Guns			Torpedo tubes		Keel laid	Date of completion	Remarks
				Main	Secondary	Antiaircraft	Above water	Below water			
C. L. Light cruisers, first line.	4	40,000	33.5	8 or 9–8″			12–21″		1924, 1925	Indefinite	Myoko, Nachi, Ashigara, and Haguro.
C. L. Light cruisers, first line.	4	28,400	33	6–8″		4–3″	12–21″		1922, 1924	1925, 1927	Kako, Furutaka, Kinugasa, and Aoba.
C. L. Light cruisers, first line.	1	5,595	33	7–5.5″		2–3″	8–21″		1924	November, 1925.	Naka.
C. V. Aircraft carriers, first line.	2	53,800	{28.5 / 23	10–8″	4–4.7″	12–4.7″	{6–21″ / 4–21″	4–21″		{December, 1926 / March, 1927	{Akagi, ex-battle cruiser; Kaga, ex-battleship.
D. D. Destroyers, first line.	1	1,400	34	4–4.7″			6–21″		1923	Indefinite	No. 13.
D. D. Destroyers, first line.	8	11,560	34	4–4.7″			6–21″		1923, 1924	1925, 1927	Nos. 19, 21, 23, 25, 28, 31, 29, and 30.
S. S. Submarines, first line.	4	3,659	17	1–4.7″				6–21″	1923, 1924	1925, 1927	RO 31, 65, 66, and 67.
S. F. Fleet submarines, first line.	4	5,600	22	2–4.7″				6–21″		1926, 1927	I–53, 54, 55, and 58.
S. F. Fleet submarines, first line.	3	5,910	20	2–5.5″				6–21″		1925, 1926	I–1, 2, and 3.
S. M. Mine-laying submarines, first line.	3	3,000	16.5							1926, 1927	Nos. 21, 22, and 23.
A. M. Mine sweepers	2	1,400	20	2–4.7″		1–3″				Indefinite	Nos. 5 and 6.
Total number of units and tonnage.	36	160,324									

D.—FRANCE

C. L. Light cruisers, first line.	2	20,000	34	8–8″	8–2.95″	8–1.58″	6–21.7″		1924	Indefinite	Duquesne and Tourville.
C. L. Light cruisers, first line.	3	23,619	34	8–6.1″	6 smaller guns.		12		1922, 1923	1925, 1926	Duguay-Taouin, Lamotte-Picquet, Primaguet.
C. V. Aircraft carriers, first line.	1	21,160	21.6	8–6.1″		6–3.9″		6–21.7″		Indefinite	Beark, ex-battleship.
D. L. Destroyer leaders	6	14,154	35.5	5–5.1″		2–2.9″	6–21.7″		1922, 1923	1925, 1926	Leopard, Lynx, and Tigre, Jaguar, Panthera, Chacal.

D. D. Destroyers, first line	12	17,208	33	4–5.1″	2–2.9″		6–21.7″			December, 1925	Cyclone, 1,434-ton class.
D. D. Destroyers, first line	6	8,826								1926	L'Adroit, 1,471-ton class.
S. S. Submarines, first line	2	3,120	18	1–3.9″				10		Indefinite	Redoubtable and Vengeur.
S. S. Submarines, first line	9	10,161	16	1–3.9″				10	1922, 1923	1925, 1926	Requin, 1,129-ton class.
O. S. B. Submarines, second line.	12	7,080	14	1–3.9″				7	1923, 1924	1925, 1926	Ariane, 590-ton class.
A. O. Oil tankers	1	6,500									Loing.
Total number of units and tonnage.	54	131,828									

E.—ITALY

C. L. Light cruisers, first line,	2	20,000	36	8–8″ (twin gun turret).	12–4″		8 (4-twin)		1923	October, 1926	Trento and Trieste.
D. D. Destroyers, first line	4	4,096	36	3–4.7″				4–23.4″ or 6–18″ tubes.	1923	Indefinite	G. Nicotera, Q. Sella, B. Ricasoli, and F. Crispi.
D. D. Destroyers, first line	4	5,200	35	4–4.7″			30 mines	6–21″ 2 tr.	1924	Indefinite	D. Manin, N. Sauro, C. Battisti, and F. Nullo.
D. D. Destroyers, first line	8	10,840	36						1925	Indefinite	Euro, Nembo, Turbine, Acquilone-Botea, Espero, Ostro, and Zeffiro.
D. M. Light mine layers[7]	9	6,486	10	1–14 pdr			200 mines		1925	Indefinite	Lepanto, Milazzo, Ostio, Pelagosa, Legnano, Anzio, V. Pisani, Durazzo, Buccari, and Pelagosa.
S. S. Submarines, first line	4	3,220	17.5	1–4″				6–21″	1925	Indefinite	V. Pisani, Sperl, G. Bausan, and M. Colonna.
S. S. Submarines, first line	4	3,120	17.5	1–4″				5–21″	1925	Indefinite	Maraniello, P. Capponi, G. Da Procida, and Da Geneys.
S. F. Fleet submarines, first line.	4	5,200	18	1–4.7″			6–21″		1923, 1924	1925, 1926	D. M. Lire. Balilla, A. Sciesa, and E. Toti.
A. V. Heavier-than-air craft tender	1	4,920		6–3″ or 4″ A. A.						Indefinite	Guiseppe Miraglia.
P. C. Patrol vessels	8	168	26		2 mg. guns			2		Indefinite	(?)
Total number of units and tonnage	48	63,250									

[7] To be combined mine layers and mine sweepers. Data as to speed, battery, etc., applies only to three vessels. No data available as to other six.

Foreign programs and policies—Data ships—Building—All classes—Continued

F. LIGHT CRUISERS, FIRST LINE, BUILDING OR AUTHORIZED AND APPROPRIATED FOR—TREATY NAVIES

Type	United States		British Empire		Japan		France		Italy	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons	No.	Tons
C. L. Light cruisers, first line (5"-8" guns, 3,000-10,000 tons; 27 knots+).	2	20,000	13	[8] 125,100	9	73,995	6	53,619	2	20,000

G.—FLEET, CRUISER, AND MINE-LAYING SUBMARINES, FIRST LINE, BUILDING OR AUTHORIZED AND APPROPRIATED FOR

S. F. Fleet submarines, first line (3" guns +; 1,000 tons+; 20 knots+).	1	2,119	1	1,480	18	26,280	0	----------	4	5,200
S. M. Mine-laying submarines (3" guns+; 800 tons+; 10 knots+).	1	----------	0	----------	3	3,000	2	6,000	0	----------
S. C. Cruiser submarines (4" guns+; 2,000 tons+; 16 knots+).	2	----------	0	----------	0	----------	0	----------	0	----------

H.—SUBMARINES, FIRST LINE, BUILDING OR AUTHORIZED AND APPROPRIATED FOR

S. S. Submarines, first line (3" guns+ 700 tons+; 13 knots+).	0	----------	2	1,780	4	3,659	11 7	[9] 13,281 ([10])	8	6,340

[8] Includes two 10,000-ton cruisers building for Australia.
[9] Building.
[10] Tonnage not known.

United States, British Empire, and Japan

A.—LIGHT CRUISERS, FIRST LINE, 5″-8″ GUNS, 3,000–10,000 TONS, 27 KNOTS PLUS, BUILT, BUILDING, OR AUTHORIZED, AND APPROPRIATED FOR

United States									British Empire									Japan								
Type	Built		Building		Appropriated and authorized		Total		Type	Built		Building		Appropriated and authorized		Total		Type	Built		Building		Appropriated and authorized		Total	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons		No.	Tons	No.	Tons	No.	Tons	No.	Tons		No.	Tons	No.	Tons	No.	Tons	No.	Tons
Omaha 7,500	10	75,000	--	-------	2	20,000	12	95,000	Suffolk 10,000	--	-------	7	70,000	4	40,000	11	110,000	Myoko 10,000	--	-------	4	40,000	--	-------	4	40,000
									Hawkins 9,750	4	39,000	--	-------	--	-------	4	39,000	Kako 7,100	--	-------	4	28,400	--	-------	4	28,400
									Emerald 7,550	--	-------	2	15,100	--	-------	2	15,100	Jintsu 5,595	2	11,190	1	5,595	--	-------	3	16,785
									Despatch 4,765	2	9,530	--	-------	--	-------	2	9,530	Isuzu 5,570	6	33,420	--	-------	--	-------	6	33,420
									Durban 4,650	6	27,900	--	-------	--	-------	6	27,900	Kuma 5,500	5	27,500	--	-------	--	-------	5	27,500
									Cairo 4,190	10	41,900	--	-------	--	-------	10	41,900	Tenryu 3,500	2	7,000	--	-------	--	-------	2	7,000
									Caledon 4,120	3	12,360	--	-------	--	-------	3	12,360	Yubari 3,100	1	3,100	--	-------	--	-------	1	3,100
									Concord 3,750	12	45,000	--	-------	--	-------	12	45,000									
									Aurora 3,500	1	3,500	--	-------	--	-------	1	3,500									
Total	10	75,000	--	-------	2	20,000	12	95,000	Total	38	179,190	9	[1]85,100	4	40,000	51	304,290	Total	16	82,210	9	73,995	--	-------	25	156,205

B.—LIGHT CRUISERS, SECOND LINE, 8″ GUNS MINUS, 3,000–8,000 TONS, 27 KNOTS MINUS, BUILT, BUILDING, OR AUTHORIZED, AND APPROPRIATED FOR

Chester 3,750	3	11,250	--	-------	--	-------	3	11,250	Adelaide 5,550	1	5,550	--	-------	--	-------	1	5,550	Chitose 4,992	1	4,992	--	-------	--	-------	1	4,992
Olympia 5,865	1	5,865	--	-------	--	-------	1	5,865	Birmingham 5,440	2	10,880	--	-------	--	-------	2	10,880	Chikuma 4,950	3	14,850	--	-------	--	-------	3	14,850
Denver 3,200	5	16,000	--	-------	--	-------	5	16,000	Brisbane 5,400	6	32,400	--	-------	--	-------	6	32,400	Tone 4,100	1	4,100	--	-------	--	-------	1	4,100
Albany 3,430	2	6,860	--	-------	--	-------	2	6,860	Dartmouth 5,250	3	15,750	--	-------	--	-------	3	15,750	Tsushima 3,420	1	3,420	--	-------	--	-------	1	3,420
Total	11	39,975	--	-------	--	-------	11	[2]39,975	Total	12	64,580	--	-------	--	-------	12	[3]64,580	Total	6	27,362	--	-------	--	-------	6	[4]27,362

[1] Includes two 10,000-ton cruisers building in England for Australia.
[2] Dates of completion range from 1895 to 1908.
[3] Dates of completion range from 1911 to 1922.
[4] Dates of completion range from 1899 to 1912.

C.—C. V. AIRCRAFT CARRIERS, FIRST LINE, 8″ GUNS MINUS, 20,000 TONS PLUS, 20 KNOTS PLUS, BUILT, BUILDING, OR AUTHORIZED AND APPROPRIATED FOR

United States									British Empire									Japan								
Type	Built		Building		Appropriated and authorized		Total		Type	Built		Building		Appropriated and authorized		Total		Type	Built		Building		Appropriated and authorized		Total	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons		No.	Tons	No.	Tons	No.	Tons	No.	Tons		No.	Tons	No.	Tons	No.	Tons	No.	Tons
Lexington.. 33,000	..	.....	2	66,000	..	.....	2	66,000	Eagle..... 22,790	1	[5]22,790	..	.....	..	.....	1	22,790	Kaga..... 26,900	..	.....	2	53,800	..	.....	2	53,800
									Furious... 19,100	1	19,100	..	.....	..	.....	1	19,100									
									Glorious.. 18,600	..	.....	2	[6]37,200	..	.....	2	37,200									
Total.....	..	.....	2	66,000	..	.....	2	[7]66,000	Total.....	2	41,890	2	37,200	..	.....	4	79,090	Total.....	..	.....	2	53,800	..	.....	2	53,800

D.—O. C. V. AIRCRAFT CARRIERS, SECOND LINE, 8″ GUNS MINUS, 20,000 TONS MINUS, 20 KNOTS

Langley.... 12,700	1	12,700	..	.....	..	.....	1	12,700	Argus..... 14,450	1	[5]14,450	..	.....	..	.....	1	14,450	Hosho..... 9,500	1	[5]9,500	..	.....	..	.....	1	9,500
									Hermes... 10,950	1	[5]10,950	..	.....	..	.....	1	10,950									
Total.....	1	[5]12,700	..	.....	..	.....	1	12,700	Total.....	2	25,400	..	.....	..	.....	2	25,400	Total.....	1	9,500	..	.....	..	.....	1	9,500
Grand total..	..	.....	..	.....	..	.....	3	78,700	Grand total..	..	.....	..	.....	..	.....	6	104,490	Grand total..	..	.....	..	.....	..	.....	3	63,300

E.—A. V. AIRCRAFT TENDERS

Wright..... 11,500	1	11,500	..	.....	..	.....	1	11,500	Ark Royal. 7,080	1	7,080	..	.....	..	.....	1	7,080	Wakamiya. 5,875	1	5,875	..	.....	..	.....	1	5,875
									Pegasus.... 3,070	1	3,070	..	.....	..	.....	1	3,070									
Total.....	1	11,500	..	.....	..	.....	1	11,500	Total.....	2	10,150	..	.....	..	.....	2	10,150	Total.....	1	5,875	..	.....	..	.....	1	5,875

[5] Experimental and can be replaced.

[6] Courageous and Glorious.

[7] Treaty tonnage.

F.—S. F. FLEET, CRUISER, AND MINE-LAYING SUBMARINES, FIRST LINE, 3″ GUNS PLUS, 1,000 TONS PLUS, 20 KNOTS PLUS

United States									British Empire									Japan								
Type	Built		Building		Appropriated and authorized		Total		Type	Built		Building		Appropriated and authorized		Total		Type	Built		Building		Appropriated and authorized		Total	
	No.	Tons	No.	Tons	No.	Tons	No.	Tons		No.	Tons	No.	Tons	No.	Tons	No.	Tons		No.	Tons	No.	Tons	No.	Tons	No.	Tons
V-1 2,119	2	4,238	1	2,119	--	--	3	6,357	X-1 2,780	1	2,780	--	--	--	--	1	2,780	I-51 1,400	2	2,800	4	5,600	--	--	6	8,400
T-1 1,106	3	3,318	--	--	--	--	3	3,318	K-26 2,140	2	4,280	--	--	--	--	2	4,280	I-1 1,970	--	--	3	5,910	--	--	3	5,910
No. (SM)	--	--	1	--	--	--	1	--	K-2 1,880	5	9,400	--	--	--	--	5	9,400	--	--	--	--	--	11	14,770	11	[8] 14,770
V-5 (SC)	--	--	2	--	--	--	2	--	O-1 1,480	--	--	1	1,480	--	--	1	1,480	I-21 (SM) 1,000	--	--	3	3,000	--	--	3	3,000
Total	5	7,556	4	[9] 2,119	--	--	9	[10] 9,675	Total	8	16,460	1	1,480	--	--	9	17,940	Total	2	2,800	10	14,510	11	14,770	23	32,080

G.—S. B. MONITOR-TYPE SUBMARINES

M-1 1,600	3	4,800	--	--	--	--	3	4,800																		
Total	3	4,800	--	--	--	--	3	4,800																		

H.—S. S. SUBMARINES, FIRST LINE, 3″ GUNS PLUS, 700 TONS PLUS, 13 KNOTS PLUS

S-1 854	25	21,350	--	--	--	--	25	21,350	L-52 960	6	5,760	--	--	--	--	6	5,760	RO-60 998	6	5,988	3	2,994	--	--	9	8,982
S-3 876	14	12,264	--	--	--	--	14	12,264	L-33 890	20	17,800	2	1,780	--	--	22	19,580	RO-51 900	9	8,100	--	--	--	--	9	8,100
S-48 993	4	3,972	--	--	--	--	4	3,972	L-14 (SM) 890	3	2,670	--	--	--	--	3	2,670	RO-26 750	3	2,250	--	--	--	--	3	2,250
S-42 906	6	5,436	--	--	--	--	6	5.436										RO-13 740	13	9,620	--	--	--	--	13	9,620
S-2 800	1	800	--	--	--	--	1	800										RO-11 720	2	1,440	--	--	--	--	2	1,440
																		RO-3 689	5	3,445	--	--	--	--	5	3,445
																		RO-29 665	3	1,995	1	665	--	--	4	2,660
Total	50	43,822	--	--	--	--	50	43,822	Total	29	26,230	2	1,780	--	--	31	28,010	Total	41	32,838	4	3,659	--	--	45	36,497

[8] Submarines are to be approximately as follows: One of 1,970 tons; 7 of 1,400 tons each; 3 of 1,000 tons each.
[9] Does not include tonnage of one S. M. mine-laying submarine building and tonnage of 2 S. C. cruiser submarines.

British Empire

A.—SHIPS BUILDING, AUTHORIZED AND PROJECTED, TO BE LAID DOWN FROM 1925 TO 1930

Types	Building	Year 1925–26	Year 1926–27	Year 1927–28	Year 1928–29	Year 1929–30
	Number of units	Number of units	Number of units	Number of units	Number of units	Number of units
B. B. Battleships, first line	2					
C. V. Aircraft carriers, first line	2					1
C. L. Light cruisers, first line [1]	9	4	2	1	1	1
C. L. Light cruisers, first line [2]			1	2	2	2
D. D. Destroyers, first line	2			9	9	9
C. M. Mine layers, first line	1					
S. F. Fleet submarines, first line	1		6	6	6	6
S. S. Submarines, first line	2					
P. G. Gunboats and patrol vessels		[3] 4			1	
P. C. Patrol vessels	2					
P. E. Patrol vessels			4			
A. S. Submarine tenders			1		1	
A. R. Repair ships			1			
A. G. Auxiliaries, miscellaneous (net layer)						1

[1] Cruisers for year 1925–26 through year 1929–30 are to be 10,000 tons.
[2] Cruisers are to be 8,000 tons.
[3] Appropriated for.

Japan

B.—BUILDING, AUTHORIZED AND PROJECTED, TO BE LAID DOWN FROM 1925 TO 1931

Types	Building	Authorized to be completed by 1930–31
	Number of units	Number of units
C. L. Light cruisers, first line	9	
C. V. Aircraft carriers, first line	2	
D. D. Destroyers, first line	9	[1] 11
S. S. Submarines, first line	4	
S. F. Fleet submarines, first line	7	[1,2] 11
S. M. Mine-laying submarines, first line	3	
A. M. Mine sweepers	2	
O. C. M. Mine layers second line		[1] 1

[1] Appropriated for.
[2] 1,000 to 1,970 tons.

France

C.—BUILDING, AUTHORIZED AND PROJECTED, TO BE LAID DOWN FROM 1925 TO 1929

Types	Building	Year 1925	Year 1926	Year 1927	Year 1928	Year 1929
	Number of units	Number of units	Number of units	Number of units	Number of units	Number of units
C. V. Aircraft carriers, first line	1	[1] 1				
C. L. Light cruisers, first line	5	[1] 1	1	1	1	
D. D. Destroyers, first line	18	[1] 4	4	4	4	2
D. L. Destroyer leaders	6	[1] 3	3	3	3	3
C. M. Mine layers, first line		[1] 1			1	
S. C. Cruiser submarines			1		1	
S. S. Submarines, first line	11	[1] 7	5	5	6	5
O. S. S. Submarines, second line	12					
S. M. Mine-laying submarines, first line		[1] 2	1	1	1	1
A. O. Oil tankers	1	Four between 1925–1928.				
A. S. Submarine tender			1			

[1] Appropriated for.

Italy

D.—SHIPS, BUILDING

Types	Building [1]
	Number of units
C. L. Light cruisers	2
D. D. Destroyers, first line	16
D. M. Light mine layers	9
S. S. Submarines, first line	8
S. F. Fleet submarines, first line	4
A. V. Heavier-than-aircraft tender	1
P C. Patrol vessels	8

[1] By 1928 all to be completed.

No final decision concerning Italian building program now under consideration.

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A.—DATA AS TO SHIPS IN COMMISSION, IN RESERVE, AND OUT OF COMMISSION

Type	United States			British Empire							Japan			
	Total No. of type	In commission	Out of commission	Total No. of type	In commission	Reduced or special complement	Reserve	No crew	Care and maintenance party	Paid off	Total No. of type	In commission	Reserve ready [1]	Special reserve [2]
B. B. Battleships, first line (12″ guns+; 20,000 tons+; 20 knots+)	18	18		18	13		4			[3]1	6	5	1	
O. B. B. Battleships, second line (12″ guns+; 20,000 tons−; 20 knots−)														
B. M. Monitors, first line (14″ guns+; 6,000 tons+)				3		3								
C. B. M. Monitoes, second line (12″ guns−; 6,000 tons−)				2						2				
C. C. Battle cruisers, first line (13.4″ guns+; 27,000 tons+; 27 knots+)				4	2	1				[3]1	4	3	1	
C. A. Cruisers, first line (12″ guns+; 10,000 tons+; 27 knots+)														
O. C. A. Cruisers, second line (8″ guns+; 8,000 tons+; 27 knots−)	11	5	6								7	5	1	1
C. L. Light cruisers, first line (5″–8″ guns; 3,000–10,000 tons; 27 knots+)	10	10		38	31	1	2			{2 [3]2}	16	14	2	
O. C. L. Light cruisers, second line (8″ guns−; 3,000–8,000 tons; 27 knots−)	11	3	8	12	3	3	2		1	{1 [3]2}	6	3	1	2
C. V. Aircraft carriers, first line (8″ guns−; 20,000 tons+; 20 knots+)				2	2									
O. C. V. Aircraft carriers, second line (8″ guns−; 20,000 tons−; 20 knots−)	1	1		2	2						1	1		
C. M. Mine layers, first line (8″ guns−; 3,000–10,000 tons; 27 knots+)														
O. C. M. Mine layers, second line (8″ guns−; 3,000 tons+; 27 knots−)	4	2	2	1		1					3	3		
D. D. Destroyers, first line (4″ guns+; 800–1,500 tons; 27 knots+)	267	106	161	183	{54 [4]8}	37	80			{1 [3]3}	72	53	19	
O. D. D. Destroyers, second line (4″ guns−; 500–800 tons; 25 knots+)	8		8	6		1	5				12	12		
D. L. Destroyer leaders (4″ guns+; 1,500 tons+; 27 knots+)				18	{8 [4]1}		9							
D. M. Light mine layers (5″ guns−; 3,000 tons−; 27 knots+)	14	6	8	[5]										
S. S. Submarines, first line (3″ guns+; 700 tons+; 13 knots+)	50	49	1	26	20		6				41	37		4
O. S. S. Submarines, second line (3″ guns−; 700 tons−; 10 knots+)	65	32	33	25	19		4			2	10			10

S. F. Fleet submarine, first line (3" guns+ 1,000 tons+; 20 knots+)	5	2	3	8	7		1				2	2		
O. S. F. Fleet submarines, second line (3" guns; 1,000 tons+; 20 knots−)				1						1				
S. C. Cruiser submarines (4" guns+; 2,000 tons+; 16 knots+)														
S. M. Mine-laying submarines, first line (3" guns+; 800 tons+; 10 knots+)				3	1	1	1							
O. S. M. Mine-laying submarines, second line (3" guns; 800 tons−; 8 knots+)														
S. B. Monitor type submarine (6" guns+; 1,000 tons+; 12 knots+)				3	1		2							
P. G. Gunboats and patrol vessels (3" guns+; 500–3,000 tons; 20 knots−)	5	5		62	36	3	3	1	11	8	7	2	1	4
River gunboats	4	4		18	15					3	7	7		
P. Y. Yachts	8	6	2	3	2					1				
P. E. Patrol vessels (100–500 tons)	53	22	31	59	3	12	1	43			25	25		
P. C. Patrol vessels (100 tons−)	35	30	5	37	No data. 30.									
A. D. Destroyer tenders	9	6	3	7	5					2	3	3		
A. S. Submarine tenders	8	7	1	10	3		4							
A. V. Heavier-than-aircraft tenders	1	1		2	9	1					11	10	1	
A. Z. Lighter-than-aircraft tenders	1	1					2				1	1		
A. R. Repair ships	3	2	1	1	1									
A. F. Storeships	5	2	3								1	1		
A. C. Colliers	5	2	3	1						1	1	1		
A. O. Oilers	19	9	10	66	No data. Apparently out of commission. 24.									
A. E. Ammunition ships	2	1	1		41					1	14	6	8	
A. K. Cargo ships	7	4	3	7	No data. Three.									
A. P. Transports	2	2			4						4	3	1	
A. H. Hospital ships	3	2	1	1	1									
A. T. Fleet tugs	37	28	9	41	No data. Thirty-six.									
A. M. Mine sweepers	44	34	10	65	5						37	37		
Surveying ships (auxiliaries and miscellaneous)	1	1		10	13	7	45				22	22		
A. G. Auxiliaries and miscellaneous	5	5		6	9				1		3		3	
					3			2		1	6	3	3	

[1] Reserve. Have approximately 80 per cent crew aboard, all officers except reduced junior officer complement. Ships are ready for service on very short notice.
[2] Special reserve. Between 10 and 20 per cent of crew aboard, except submarines, which have no crew assigned.
[3] Paid off for refit.
[4] Two-fifths complement.
[5] There are four small mine layers converted from light-draft monitors, the M-22, M-23, M-29, and M-33—52 mines—listed under P. E.

A.—TABLE SHOWING COMPARATIVE PERSONNEL STRENGTHS

Items	United States			British Empire [1]			Japan			France			Italy		
	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total
1. Regular Navy	[2] 8,312	[3,4] 81,702	[5] 90,014	[6] 7,839	[7] 82,847	90,686	[8] 7,143	65,412	72,555	[9] 3,493	[10] 50,487	53,980	2,233	40,881	43,114
2. Royal Australian Navy				378	4,291	[11] 4,669									
3. Royal Canadian Navy				59	411	[12] 476									
4. New Zealand Division of Royal Navy				41	492	[13] 533									
5. South African Division of Royal Navy				15	116	[14] 131									
6. Royal Indian Marine				157	1,122	1,279									
7. Royal Air Force assigned to naval aviation				357	2,480	[15] 2,837									
8. Civilian crews of auxiliaries					[16] 4,157	[16] 4,157									
Total	8,312	81,702	90,014	8,846	95,922	104,768	7,143	65,412	[17] 72,555	3,493	50,487	[18] 953,980	2,233	40,881	43,114

[1] Regarding Dominion navies and India the figures relate to following dates:
(*a*) Officers—Active service, Oct. 1, 1925.
(*b*) Officers—Reserve, as under (*c*).
(*c*) Dominion ratings.
Australia, Canada, and New Zealand, Mar. 31, 1925. South Africa, June 30, 1925. India, as per R. I. M. estimates for 1925–26.

[2] Includes line, medical, dental, supply, chaplain, professors, construction, civil engineer, chief warrant and warrant officers.

[3] Total number of men appropriated for is 81,770 for 1925-26.

[4] The number of recruits enlisted in the United States Navy for the year ending Sept. 30, 1925, was 9,855. The number of recruits entered in the British Navy for the year ending Sept. 30, 1925, was 6,958, of whom 492 were reentries from the shore.

[5] The following gives the percentage of officers and men afloat as of Oct. 1, 1925:

United States		British Empire		Japan
Officers	Men	Officers	Men	Total personnel
52.49 per cent	75.3 per cent	57.98 per cent	68.77 per cent	60 to 62 per cent.

NOTE.—British figures are as of June 15, 1925, and do not include those attached to harbor ships. Japanese figures are estimated.

[6] Includes 237 officers on half pay or unemployed pay, lent to Royal Air Force for fleet air arm; 98 lent from colonial navies; 124 naval constructors and 75 civil engineers; 374 midshipmen at sea corresponding to ensigns, United States Navy; 14 retired officers serving in British fleet. Naval constructors and civil engineers are not officers of the British Navy but perform duties similar to those of naval constructors and civil engineers, United States Navy. Does not include 131 officers lent to Dominion navies who are included under 2, 3, 4, and 5. Does not include 163 cadets in training at sea in battleships and battle cruisers.

[7] Includes 7,446 boys in training, 90 from Dominion navies; 338 pensioners serving in British fleet. Does not include 754 lent to Dominion navies who are shown under 2, 3, 4, and 5.

[8] Does not include approximately 390 midshipmen at sea. Does not include approximately 260 civilians performing naval duties, with standing corresponding to commissioned officers up to and including commander. Japanese data is of Sept. 1, 1925.

[9] Includes 75 midshipmen at sea.

[10] For calendar year ending 1924. Allowed strength 55,000.

[11] Includes 105 officers, 439 men lent from Royal Navy, of these there are 1 emergency officer, 22 retired officers, 24 pensioners, all of whom are on active list, Australian Navy. Does not include 82 officers, 30 men, belonging to Australian Navy and who are now serving in Royal Navy and who were included in Royal Navy figures.

[12] Includes 11 officers (2 retired) and 28 men lent from Royal Navy. Does not include 16 officers, 20 men of Canadian Navy lent to Royal Navy and who are included in Royal Navy figures.

[13] Includes 36 officers, 287 men lent from Royal Navy. Does not include 40 men of New Zealand Navy lent to Royal Navy.

[14] Includes 3 officers, 21 men active service Royal Navy, and 7 officers retired Royal Navy but in active service with South African Division of Royal Navy.

[15] The Royal Air Force supplies a large proportion of personnel for naval aviation. The only strictly naval personnel in the naval aviation service consists of 119 officers and 391 men, which are not included in item (7) but are carried in item (1). Six hundred and thirty-eight officers and 3,672 men are employed in United States naval aviation, exclusive of those for general service in aircraft carriers, tenders, etc. The figures shown for the Royal Air Force in item (7) are those attached to the coastal area headquarters for aircraft carriers, for flights abroad, etc. On Aug. 31, 1925, the total strength of the Royal Air Force was 3,448 officers, including 109 cadets, 29,797 airmen, and 8,763 civilians and natives. Of these totals, 2,425 officers, including 109 cadets, 21,900 airmen and 3,439 civilians were in home stations, such as air ministry, training stations, supply depots, manufacturing plants, etc., the duty performed being for both that portion of the air force detailed to fleet air arm and that portion serving in cooperation with the Army and as a separate air force, a portion of this personnel should be considered in making a comparison.

[16] The total shown, 4,157, includes the merchant marine officers manning auxiliaries, but data are not available to separate this total into officers and men. This personnel mans the auxiliaries which are manned in United States Navy by regular officers and men.

[17] Includes personnel assigned to aviation duty, estimated 250 officers and 2,460 men.

[18] Includes French naval aviation, which comprises 210 officers and 3,500 enlisted men.

B.—NUMBER OF CIVILIANS ON MERCANTILE OR YARD CRAFT AGREEMENT FOR NAVY

Type	United States			British Empire			Japan			France			Italy		
	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total
1. Tankers	All manned by regulars, United States Navy.					1,760	Items (1) to (6) manned by regulars, Japanese Navy.			Manned by regulars, French Navy.					
2. Various yard craft						1,499									
3. Naval armament vessels						200									
4. Victualling yard craft						278									
5. Hospital ships						107									
6. Fleet service tugs						77									
7. Ferry service and harbor launches						236									
Total						4,157									

NOTE.—Percentage of sea transportation of fuel, stores, etc., for naval use which is done in merchant vessels or auxiliaries with merchant marine crews:

1. Oil fuel: 80 per cent in government-owned auxiliaries with mercantile crews; 20 per cent in commercial tankers.
2. Coal: 100 per cent in commercial vessels.
3. Stores: 15 per cent in government-owned auxiliaries with mercantile crews; 54 per cent in other government-owned auxiliaries; 31 per cent in commercial vessels.

Table showing comparative personnel strength

C.—NAVAL RESERVES

Items	United States			British Empire			Japan			France			Italy		
	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total	Officers	Men	Total
United States Fleet Naval Reserves	1,059	12,483	13,542												
United States Merchant Marine Naval Reserves	73	2	75												
United States Volunteer Naval Reserve	2,536	12,268	14,804												
Retired officers and pensioners	1,369	277	1,646	[1] 7,324	[2] 19,020	26,344									
Special reserve of engineer officers				241		241									
Emergency officers				216		216									
Royal Fleet Reserve, class A (pensioners)					6,662	6,662									
Royal Fleet Reserve, class B and class C (artisans—42), nonpensioners					18,507	18,507									
Royal Naval Reserve				1,583	7,690	9,273									
Royal Naval Volunteer Reserve				346	3,599	3,945									
Royal Naval Auxiliary sick berth reserve					1,275	1,275									
Australia				566	6,188	6,754									
Canada				95	922	1,017									
New Zealand				23	230	253									
South Africa				31	649	680									
Other naval reserves							3,394	38,988	42,382	8,945	153,980	162,925	4,731	60,000	64,731
Total	5,037	25,030	30,067	10,425	64,742	75,167	3,394	38,988	42,382	8,945	153,980	162,925	4,731	60,000	64,731

[1] All ages, includes 1,314 engineer officers.
[2] All under 55 years of age, excludes Royal Fleet Reserve, class A.

TABLE D.—*Comparison of Marine Corps*

United States [1]			British Empire [4]			Japan		
Officers	Men	Total	Officers	Men	Total	Officers	Men	Total
[2] 1,169	17,731	[3] 18,900	[5] 443	[6] 9,971	[7] 10,414	0	0	[8] 0

[1] Number of officers and men, United States Marines, that serve afloat: Officers, 64; enlisted men, 2,113.
[2] Includes 155 warrant officers.
[3] There are included 81 officers and 865 men engaged in Marine Corps aviation duty (Marine Expeditionary Force).
[4] Number of officers and men, British marines, that serve afloat: Officers, 180; men, 5,782. Percentage of total number of officers and men afloat: Officers, 40.63; men, 57.99.
[5] In addition, 5 on half pay, unemployed pay, or lent to Dominion navies. Includes 17 R. N. School of Music, 6 of whom serve afloat; includes 7 borne for wireless work.
[6] In addition, 58 lent to Dominion navies. Includes 882 R. N. School of Music, 544 of whom serve afloat; includes 185 R. M. signallers, 23 of whom are signalling instructors. Does not include 31 pensioners in H. M. Fleet.
[7] In addition, there is the Royal Marine Reserve, consisting of 636 retired officers, all ages, 4,261 enlisted men pensioners under 55 years of age; 1,498 Royal Fleet Reserves, Class A (pensioners), 1,894 Royal Fleet Reserve, Class B (nonpensioners), and 4 officers and 37 pensioners in Dominion navies (inactive reserve).
NOTE.—Patrol of shore stations is carried out by a special force—Royal Marine Police, 8 officers, 282 men; metropolitan police, 672; civilian police, 393. No regular marines are used for this duty.
[8] Japan has no force corresponding to the Marine Corps of the United States and of the British Empire. The guarding of navy yards, etc., is carried out by marine police under the Minister of Marine. There were 850 marine police in 1924; no data for 1925.

UNITED STATES

Enlistments in the Navy are for four or six years. Extensions of enlistments may be made for one, two, three, or four years.

An examination of the enlisted personnel as of September 30, 1925, shows the following:

Men with less than 4 years' service	43,723
Men with 4 and less than 8 years' service	23,727
Men with 8 and less than 12 years' service	7,432
Men with 12 and less than 16 years' service	4,721
Men with more than 16 years' service	2,099

NOTE.—The handicap which a short period of enlistment places upon a navy should be recognized in connection with this general comparison of personnel.

The short period of enlistment in the United States Navy with its accompanying heavy yearly turnover in men necessitates large items in cost and personnel to handle matters of recruiting and training. As illustrating this point, the United States Navy has need of more than 600 enlisted men in the recruiting service. Great Britain with a relative small yearly turnover in personnel needs but 27. Different economic conditions in the two countries also bear upon the subject. Great Britain benefits by the longer periods of enlistments in reduced operating costs. Seasonal personnel in long enlistments require less steaming and gunnery exercises, less instruction at shore establishments and aboard ship to maintain the same relative efficiency with a personnel in short periods of enlistments.

TABLE E.—*Remarks on enlistments*

BRITISH EMPIRE

Number of petty officers, etc., Royal Navy:	
Chief petty officers	9,337
Petty officers	11,117
Leading ratings	11,136
A. B. ratings	38,809
Ordinary ratings	4,574
Boys (service), seamen class	3,130
Boys under training, seamen class	3,508
Boys under training, artificer class	795
Boys under training, writers	13
Total	[1, 2] 82,419

[1] Character of enlistments in this force:

(1) Number of boys under training and boys (service)	7,446
(2) Serving first enlistment of continuous service, viz, for 12 years	50,782
(3) Serving second period of continuous service, viz, 10 years to complete 22 for pension	20,645
(4) Special service, viz, 5 years after which transfer to reserve	847
(5) Noncontinuous service, British, Maltese, foreigners, and miscellaneous	2,699

[2] Does not include 754 rating lent to Dominion navies.

NOTE.—Boys (service) are those who have been sent to sea after a certain amount of training ashore, and are in addition to the regular complements as stated for the vessels on which they are serving. Boys under training are those at training establishments ashore, and have not as yet been sent to sea.

ROYAL MARINES

(1) Number serving first enlistment of continuous service	7,467
(2) Number serving second period of continuous service	2,444
(3) Miscellaneous	60

JAPAN

Enlistments for all petty officers is for 10 years (6 years active, 4 years reserve).

For other enlisted men the period is 12 years. For volunteers this period is 6 years' active service, 6 years first reserve. For conscripts this period is 4 years active, 3 years first reserve, 5 years second reserve.

A.—COMPARATIVE TABLE SHOWING DIVISION OF COMMISSIONED AND SUBORDINATE OFFICERS IN ACCORDANCE WITH RANK

[Except all Japanese data on this sheet as of September 1, 1924. Data for 1925 not furnished by Japanese Navy department]

Corps	Admiral of fleet			Admiral			Vice Admiral			Rear Admiral			Captain			Commander			Lieutenant Commander			Lieutenant			Lieutenant (j. g.), sub-lieutenant			Ensign			Midshipman at sea			Totals		
	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan
Line [1]	5	----	--	11	----	11	20	----	13	59	51	52	288	216	167	663	384	401	972	689	705	1,523	1,596	991	465	830	1,188	----	1,131	0	[2] 331	----	355	4,337	4,897	3,883
Medical	----	----	--	----	----	--	1	----	1	6	4	5	20	34	19	185	66	50	94	329	72	94	223	136	----	159	158	----	----	0	----	----	----	400	815	441
Dental	----	----	--	----	----	--	----	----	--	----	----	--	----	----	--	1	----	--	21	66	----	26	72	----	----	21	----	----	----	--	----	----	----	48	159	------
Supply	----	----	--	----	----	--	----	----	1	1	3	5	24	24	18	161	46	35	113	75	67	179	380	120	14	30	111	----	16	--	[3] 43	----	36	535	574	393
Chaplain	----	----	--	----	----	--	----	----	--	----	----	--	----	15	----	----	30	----	----	12	----	----	11	----	----	17	----	----	----	--	----	----	----	99	85	------
Instructor	----	----	--	----	----	--	----	----	--	----	----	--	4	3	----	10	4	----	16	----	----	50	----	----	----	----	----	----	----	--	----	----	----	80	7	------
Construction	[4]	----	--	[4]	----	--	[4]	----	--	[4]	2	3	[4]	20	12	[4]	33	11	[4]	16	5	10	130	15	[4]	31	15	[4]	----	--	[4]	----	----	134	232	61
Civil engineer	[5]	----	--	[5]	----	--	[6]	----	--	[5]	2	--	[5]	5	----	[5]	15	----	[5]	28	----	[5]	46	----	[5]	4	----	[5]	----	--	[5]	----	----	75	100	------
Total	5	----	--	11	----	11	21	----	15	66	62	65	336	317	216	1,020	578	497	1,216	1,215	849	1,882	2,458	1,262	479	1,092	1,472	----	1,147	--	374	----	391	5,708	6,869	[6] 4,778

[1] Under line officers, British Navy, are included officers of executive and engineer branches, and 17 specialists, i. e., 2 lieutenant commanders, telegraphists; 3 lieutenants, telegraphists; 3 lieutenants, signals; 1 lieutenant, regulating; 2 lieutenants, ordnance; 4 lieutenants, electrical; and 3 senior chief officers, shore wireless and signal services; the last are only included in the total. Under British Navy are included 308 officers on half pay, unemployed pay, lent to Royal Air Force, the Dominion navies, etc. Under line, Japanese Navy, are included officers of executive and engineer branches, and officers in ordnance, construction, engineering construction, and hydrographic branches.

[2] British Navy has no rank corresponding to ensign. The total shown is number of midshipmen at sea who are classified in British Navy estimates as subordinate officers, and who perform duties similar to those of ensigns, United States Navy.

[3] Paymaster midshipmen at sea perform same duties as ensigns, Supply Corps, United States Navy.

[4] Naval constructors are not officers in British Navy, but perform same duties as naval constructors, United States Navy, and are paid from Navy votes. See last column for total number, which includes 11 shipwright lieutenants, who are classed herein as constructors. See total column.

[5] Civil engineers are not officers in British Navy, but perform same duties as civil engineers, United States Navy. See total column.

[6] Information as of Sept. 1, 1924, includes 391 midshipmen at sea; does not include 879 special service officers who are listed below in Table B; does not include 260 civilians of commissioned-officer rank to and including commander, who perform naval duties.

NOTE.—The number of midshipmen under training is as follows: United States, 1,755; Great Britain, 707 cadets, of whom 263 are at sea in training on board battleships and battle cruisers; Japan, 774.

B.—COMPARATIVE TABLE SHOWING DIVISION OF COMMISSIONED WARRANT AND WARRANT OFFICERS IN ACCORDANCE WITH RANK

Corps	Commissioned warrant.			Warrant			Totals		
	Great Britain	United States	Japan	Great Britain	United States	Japan	Great Britain	United States	Japan
Line	766	654	770	935	243	1,340	1,701	897	2,110
Medical	4	114	13	14	22	39	18	136	52
Band			7			11			18
Supply	25	127	58	74	164	120	99	291	178
Instructor	40			151			191		
Construction	67	112	31	69	7	51	136	119	82
Miscellaneous	1			1			2		
Total	[1] 903	1,007	879	[1] 1,244	436	1,561	[1] 2,147	1,443	2,440

[1] Includes 51 on half pay, unemployed pay, lent to Royal Air Force, Dominion navies, etc.

C.—DOMINION NAVIES [1]

COMPARATIVE TABLE SHOWING DIVISION OF COMMISSIONED AND SUBORDINATE OFFICERS IN ACCORDANCE WITH RANK

Corps	Rear Admiral					Captain					Commander					Lieutenant commander					Lieutenant					Lieutenant (j. g.), sub-lieutenant					Midshipmen at sea					Totals					Grand totals
	Australia	Canada	N. Zealand	S. Africa	India	Australia	Canada	N. Zealand	S. Africa	India	Australia	Canada	N. Zealand	S. Africa	India	Australia	Canada	N. Zealand	S. Africa	India	Australia	Canada	N. Zealand	S. Africa	India	Australia	Canada	N. Zealand	S. Africa	India	Australia	Canada	N. Zealand	S. Africa	India	Australia	Canada	N. Zealand	S. Africa	India	
Line	1					13		2		10	27	5	3	1	34	28	14	6	2	46	121	32	5	5	46	20	5		4	6	34					4	244	56	16	12	146	474
Medical											5		2			3					12															20		2			22
Dental																1					5															6					6
Supply											3	1	2			9	1	1			17	1	2			6	1		2		3					38	4	5	2		49
Chaplain																																				10		1			11
Instructor											1					2					3															6					6
Construction																					1															1					1
Civil engineer																																									0
Total	1					13		2		10	36	6	7	1	34	43	15	7	2	46	159	33	7	5	46	26	6		6	6	37					4	325	60	24	14	146	569

[1] The figures relate to "active service" only, and include Dominion officers serving in the Royal Navy. Retired officers, Royal Navy, serving in Dominion navies, have been classified according to the rank held in the Dominions, which in some cases differs from that shown in the retired list, Royal Navy. Australia "line" includes 168 executive, 40 engineer, 1 ordnance lieutenant, 1 electrical commander, 2 supply cadets, not included. Canada "line" includes 51 executive, 6 engineer, 3 cadets, not included. New Zealand "line" includes 13 executive, 3 engineer. South Africa "line" includes 11 executive and 1 engineer. India "line" includes 89 executive and 53 engineer.

D.—COMPARATIVE TABLE SHOWING DIVISION OF COMMISSIONED WARRANT AND WARRANT OFFICERS

Dominions	Commissioned warrant officers	Warrant	Total
Australia	58	75	133
Canada	1	10	11
New Zealand	5	12	17
South Africa		1	1
India		11	11
Total	64	109	173

Complements of type ships in certain classes

A.—UNITED STATES

Name	Class	Date of completion	Displacement	Speed	Guns, main battery		Complement			Present allowance			Remarks
					No.	Size	Officers	Men	Total	Officers	Men	Total	
Colorado	B. B. Battleship, first line	1923	32,600	20.67	8	16″:—45 cal	71	1,266	1,337	[1] 67	1,203	1,270	
Pennsylvania	B. B. Battleship, first line	1916	31,400	21.05	12	14″:—45 cal	71	1,238	1,309	[1] 67	1,176	1,243	
New York	B. B. Battleship, first line	1914	27,000	21.47	10	14″:—45 cal	70	1,308	1,378	[1] 67	1,243	1,310	
Utah	B. B. Battleship, first line	1911	21,825	21.04	10	12″:—45 cal	70	1,196	1,266	[1] 67	1,116	1,183	
Richmond	C. L. Light Cruiser, first line	1923	7,500	34.20	12	6″:—53 cal	30	429	459	28	429	457	
Langley	O. C. V. Aircraft Carrier, second line	1922	12,700	15	4	5″:—51 cal	[2] 32	[2] 328	[2] 360	[2] 25	[2] 328	[2] 353	
Selfridge	D. D. Destroyer, first line	1921	1,215	32.56	4	4″:—50 cal	8	114	122	7	106	113	
S-49	S. S. Submarine, first line	1922	993		1	4″:—50 cal	4	40	44	4	40	44	

[1] Exclusive of officers for training. The department's policy requires that the graduating class from the Naval Academy be sent to sea on battleships if practicable. This results in having a large number of junior officers on these vessels at the beginning of the fiscal year with an average of about 75 officers in these ships for the year. These figures do not include Marine Corps personnel. On battleships the marine guard composes 2 officers, and from 69 enlisted men on the Utah to 85 men on the Pennsylvania.

[2] Exclusive of aviation officers and enlisted men.

B.—BRITISH EMPIRE

Name	Class	Date of completion	Displacement	Speed	Guns, main battery		Typical peace complement[1]			Seagoing complement	Remarks
					No.	Size	Officers	Men	Total	Total officers and men	
Warspite	B. B. Battleship, first line	1915	27,500	25	8	15″:—42 cal	67	961	1,028	1,234	
Royal Sovereign	B. B. Battleship, first line	1916	25,750	23	8	15″:—42 cal				1,201	
King George V	B. B. Battleship, first line	1912	23,000	21	10	13.5″:—45 cal				1,133	
Repulse	C. C. Battle Cruiser, first line	1916	26,500	31.5	6	15″:—42 cal	71	978	1,049	1,242	
Emerald	C. L. Light Cruiser, first line	Building.	7,550	33	7	6″				477	
Argus	O. C. V. Aircraft Carriers, second line	1918	14,450	20.21	2	9″				401	
Wild Swan	D. D. Destroyer, first line	1919	1,325	34	4	4.7″	6	110	116	130	W and V Class.
L-52	S. S. Submarine, first line	1921	960	17.5	2	4″	5	38	[4] 43	42	

[1] Includes Marines.
[2] In addition to the complements shown, it is estimated there are over 1,000 service boys who have completed shore training and who are embarked in seagoing ships for sea training.
[3] There are 163 cadets embarked in battleships and battle cruisers for sea training.
[4] One crew divided between every 3 boats.

C.—JAPAN

Name	Class	Date of completion	Displacement	Speed	Guns, main battery		Complement			Remarks
					No.	Size	Officers	Men	Total	
Mutsu	B. B. Battleship, first line	1921	33,800	23	8	16″	72	1,336	1,408	
Ise	B. B. Battleship, first line	1917	31,260	23	12	14″	74	1,360	1,434	
Fu-so	B. B. Battleship, first line	1915	30,600	22.5	12	14″	74	1,193	1,267	
Kongo	C. C. Battle Cruiser, first line	1913	27,500	27.5	8	14″	72	1,221	1,293	
Kako	C. L. Light Crusier, first line	Bldg.	7,100	33	6	8″		1	604	No data as to whether officers are included.
Tama	C. L. Light Crusiers, first line	1921	5,500	33	7	5.5″	40	420	460	
Hosho	O. C. V. Aircraft Carriers, second line	1922	9,500	25	4	5.5″	53	550	603	
No. 1	D. D. Destroyer, first line	1922	1,400	34	4	4.7″	7	148	155	
Minekaze	D. D. Destroyer, first line	1920	1,345	34	4	4.7″			148	Do.
Ro. 57	S. S. Submarine, first line	1922	900	17	1	3″			43	Do.
Ro. 60	S. S. Submarine, first line	1923	998	17	1	4.7″			60	Do.

ADDENDA

Since the preparation of these tables the following information has been received:

(*a*) Two submarines are being built by the Australian Government in England. These will probably be similar to the Admiralty O Class (1,480 surface; 1,750 submerged; 20 estimated speed).

(*b*) Australia plans to build an airplane carrier in Australia. This is made possible through the savings effected by ordering the two 10,000-ton Australian cruisers to be built in England rather than in Australia. No definite information is available concerning authorization.

OCTOBER 30, 1925.

Summary of air power afloat—Great Britain and Japan

British aircraft carriers

Name	Tonnage	Speed	Present condition	Remarks
Furious	19,100	31	In commission; ready	36 airplanes in flying condition.
Glorious	19,100	31	Being converted	36 airplanes. Estimated same as Furious.
Courageous	19,100	31	do	Do.
Eagle	26,200	24	In commission in Mediterranean.	24 airplanes in flying condition.
Hermes	16,950	25.7	do	18 airplanes in flying condition.
Argus	15,775	20	Going in reserve	15 airplanes in flying condition.
Pegasus (tender)	35,000	20.6	Reserve	3 airplanes.
Ark Royal (tender)	7,450	10.6	In reserve	

Number of airplanes that can be carried disassembled is not known.

Estimated air strength, Great Britain

Item	General service	Fleet air arm
Unit of organization	Squadron	Flight.
Total number of units	46	20.
Number of aircraft in unit	12	6.
Number of units at home	28	13.
Number of units abroad	18	7.
Number of aircraft actually in commission exclusive of school and training service.	544	116.
Number of aircraft in reserve	100 per cent	100 per cent.

Of the planes mentioned above the following numbers can be listed by types:

Pursuit (VF)	323
Observation (VO)	60
Patrol (VP)	5
Scouting (VS)	42
Torpedo and bombing (VT)	221

It should be noted that no distinction is made above between the planes assigned to general service and those assigned to the fleet air arm.

Japanese aircraft carriers

Name	Tonnage	Speed	Present condition	Remarks
Hosho	9,500	25	In commission	30 airplanes in fair flying condition.
Wakamiga (tender)	5,875	11	do	8 airplanes.
Akagi	26,900	28.5	Building; date of commission, December, 1926.	66 airplanes.
Kaga	26,900	23	To be commissioned March, 1927.	Do.

Additional vessels might be used as aircraft tenders as was done during the 1924 maneuvers.

Estimated air strength, Japan.

Item	Army	Navy
Unit of organization	Squadron	Squadron.
Total number of units	20	12.
Number of aircraft in unit	10 or 12	16.
Number of units at home	17	12.
Number of units abroad	3	
Number of aircraft actually in commission exclusive of school and training in service.	400	148.
Number of aircraft in reserve	Not known	305.

Of the planes mentioned above the following numbers can be listed by types.

	Army	Navy	Total
Pursuit (VF)	150	48	198
Observation (VO)	250	31	281
Patrol (VP)		26	36
Scouting (VS)		48	48
Torpedo and bombing (VT)		8	8

It should be noted both in the case of Great Britain and Japan that the big patrol and scout planes are capable of being extemporized for bombing operations by reduction of amount of fuel carried.

The amount of effective aviation that could be brought to bear afloat in the near future depends more upon the development of carrier facilities than upon numbers of planes available. The completion of the *Glorious* and *Courageous* will add about 72 effective planes to the British air forces afloat and the completion of the *Akagi* and *Kaga* will add about 132 to the Japanese. Neither of these countries have as yet developed catapults for their combatant ships beyond the experimental stage. Great Britain is further along in this than is Japan. British battleships have platforms which can be mounted on turrets and from which planes can be flown but recent reports indicate that they are not now in use. Some cruisers of both nations are equipped to carry from one to two planes each but reliable information is not available as to the number of cruisers so equipped, or the number of planes they carry.

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COMMENT BY THE DIRECTOR OF FLEET TRAINING ON "THE SUBMARINE WARFARE, 1914–1918," BY ANDREAS MICHELSEN, VICE ADMIRAL (RETIRED), FORMERLY COMMANDER SUBMARINE FORCES

Michelsen held the high command of German submarines during the war and reflects that point of view. In reading this article it must be remembered that the German submarine opinion varied as to the proper method of using submarines, some officers considering that they should be used more against enemy men-of-war, and Michelsen's article as a whole is an attempt to defend and justify the German submarine warfare against commerce and to explain why it failed. However, it contains many incidents showing the methods of operation and administration of submarines under varying conditions and is interesting from this point of view, rather than as substantiation of the author's opinions. It must be kept in mind, in reading many of the German submarine accounts, that the Germans were so concerned with the submarine war against commerce that they failed to appreciate the possibilities of the use of submarines against military objectives. Consequently, during a large part of the war, they were operating against a wrong objective. The few occasions during the war of the operations of submarines against military vessels form the most interesting and valuable study of all the submarine operations. In reading Michelsen's article, the above should be kept in mind.

NAVY DEPARTMENT, WASHINGTON, D. C., *1 January, 1926.*

THE SUBMARINE WARFARE, 1914–1918

By Andreas Michelsen, Vice Admiral (Ret.), Formerly Commander German Submarine Forces

PREFACE BY THE AUTHOR

The German Nation has the right to know what was accomplished by the submarine warfare and what might have been accomplished. Since a large number of books and articles dealing with this submarine warfare have appeared in the foreign press, it is now time that authoritative persons in Germany should define their position in this matter. This was impossible at an earlier date, as, in that event, the suspicion of bias would have been aroused, and such would certainly have been charged in Germany if the writer were not in a position to support his arguments by data from foreign sources. In Germany the problem of the submarine warfare led to wide differences of opinion during the war, and the pros and cons still hold the spirit of the people in leash to such an extent that a German critic could not dispel this impression if he were unable to base his arguments on foreign, and in particular on enemy opinions.

When I, as former commander of the submarine forces, undertake to write the description of the German submarine warfare, this is done not only to show the German Nation what the submarine warfare meant in reality, but also because it becomes my duty to show the deeds of these submarines in their proper perspective and to protect the submarine weapon from undeserved slander.

A strictly military account of the submarine activities seemed to me to be out of place, as this would consist solely of an account of individual deeds of valor, which, owing to their great number, would soon tire the reader. However, in order to make the aims of the submarine warfare clear to the German people, it is essential that this warfare be described from several different angles—namely, in its connection with the political event—both domestic and foreign, and with the industry (shipping, shipbuilding, food supply of the population, etc.). The contents are, therefore, subdivided accordingly.

A detailed account of the submarine warfare can not be given, since such a history would necessarily be so extensive that it would be unreadable for most of my readers. However, I hope that all facts of basic importance will be found in this book.

I wish to acknowledge my appreciation of the work done by Commander Friedrich Lutzow in checking the historical facts and dates in this book, as well as my thanks to the marine artist, Claus Bergen (Munich), for the permission kindly granted to reproduce the 21 excellent submarine pictures which were painted from material gathered on a cruise with the *U–53* during the war (under Lieutenant Rose). At this place I wish also to thank the firms Gebr. Ladewigs (Wilhelmshaven) and J. J. Weber (Leipzig) for the permission to reproduce here some of their pictures.

The pictures showing the submarine types are from the court photographer, F. Schensky, while the portraits of the commanding officers were placed at my disposal very kindly by the same photographers. For all of which I wish to express my heartiest thanks.

In particular, I wish to express my thanks to the Germania Works and the firm in Berlin for the kind permission granted to publish the submarine sketches.

(Signed) MICHELSEN.

FEBRUARY, 1925.

Chapter I

THE SUBMARINE QUESTION BEFORE THE WAR

While the development of the submarine was still in its infancy, extraordinary expectations were attached to this new weapon. This was particularly true in France, where certain of the officers' corps under the leadership of Admiral Aube (jeune ecole) took the position that the submarine would bring about a radical change in the conduct of naval warfare (the end of the battleship, decision in the war by means of commerce warfare with submarines, etc.). To-day, such optimistic hopes are more comprehensible than in those days when the submarine was still a very much undeveloped implement of naval warfare. Thus at the time of Gymnote (1886) and Gustave Zede (1890) a suitable motor for surface cruising had not yet been developed, and these boats cruised on the surface on their storage batteries with a very small radius of action; while under water they were almost blind, since the periscope had yet to be invented. Not until the middle of 1890 were light oil engines and steam engines developed suitable for surface cruising, which were further able to recharge the electric storage batteries and thus extend the submerged radius of action. These boats were known as "submersibles" (Laubeuf). Thus, as a matter of course, the advocates of the submarine increased in number to a great extent, and first America and then England began to occupy themselves with the construction of such boats in earnest, the development of which was only retarded by the lack of absolute reliability (about 1900). Since, at that time, the light oil engines, which were the only ones suitable for employment in the submarine, developed explosive gases, these constituted a real danger, as the spark necessary to ignite them was never lacking in the boat; while the gases of the storage batteries, which could not then be properly ventilated, also threatened the safety of the boat, entirely aside from the undeveloped state of the other apparatus. The accidents which followed on the submarines—and this designation includes both the submersibles and the submarines—were extraordinarily numerous and seriously hindered the further development of the weapon, since in many cases these were followed by the loss of the entire crew. For these reasons, it is understandable why Germany, which was later to instigate the first real trial of strength with these boats,

should have held back the construction of this type until 1904, when a reliable heavy oil engine appeared to be available for this service. One can appreciate and condone this delay and the slow rate at which new boats were authorized at first as a result of the necessity for the most thorough tests. Further, this reticence to include such boats in the German building program may be traced to the fact that at the time there was no thought of a world war and in particular a war against England. In England, on the other hand, there prevailed the firm opinion that war with Germany was inevitable in view of the rapid industrial expansion of the latter, and every German naval officer who had any relations with the English was easily convinced of this fact, since many of these English officers did not hesitate to express these views openly in friendly conversations (about the year 1900) much as some of them apparently regretted the necessity for such a course of action. On our side, the hope was always expressed that the two nations might develop side by side in all friendliness, since there was room enough in the world for both nations to expand industrially and commercially, with profit to themselves. The conviction which was held that our fleet was built for defensive purposes only worked together with the novelty of this weapon, to cause the orders for new construction to be held back during the years 1906 to 1909. Not until 1910 were orders placed for eight submarines, which number was increased up to the outbreak of the war to 21, of which those equipped with heavy oil engines, or the majority, were only serviceable in time of war to a limited extent on account of the heavy smoke they developed. This fact proves the correctness of our slow progress, and shows further how far from our thoughts was any idea of an offensive or any plan for the inauguration of commerce warfare with submarines.

In fact, this idea had no advocates or well-wishers amongst us, aside from a few parliamentarians, including also two grizzled old retired naval officers, who at that time demanded the construction of submarines in place of battleships. One may entirely disregard their activities, much as the proponents of this agitation praised themselves later, since their efforts were prompted by the desire to hinder the construction of battleships and the obstruction of the new fleet program. The grounds on which this extraordinary naval policy was based were proved during the war to be absolutely false, and no one to-day doubts the fact that the submarine would have been worthless without the support of a strong fleet on the surface. Lacking this, the enemy is able to deliver a body blow to the submarines in their bases and thus put an end to all submarine activities. But even if this were not the case, the submarine

was, and still is, not a sufficiently self-supporting weapon to force a decision in time of war—one can not demand everything from a single weapon.

Foreign countries were decidedly ahead of us in the number of submarines at the outbreak of the war, but our new boats equipped with Diesel engines were at least the equal, if not superior, to all foreign boats in so far as concerned matériel (from *U–19* on). The proof lies in the achievements of these boats, which were not exceeded by any other country, even England.

On the whole, it can not be denied that with us there was a lack of sympathy and support by the naval experts for this new weapon, since we did not expect war. But things were quite different abroad.

Meanwhile, the views of Admiral Aube and the "jeune ecole" had borne fruit. In England the well-known admiral and reformer of British naval gunnery, Sir Percy Scott, had announced his full agreement with the policy of employing submarines for commerce warfare (see his article in the Times of 16 July, 1914). A detailed memorandum of Lord Fisher, the former First Lord of the Admiralty, on 14 May, 1914, also justified the commerce warfare with submarines, and in his later memoirs further openly announced his advocacy of this policy. Thus a large number of the advocates of the submarine weapon have not allowed themselves to be led astray by the hypocritical disarmament propaganda—which loosed a systematic agitation against our policy of submarine commerce warfare—and who, since the war, have come forward to justify our course in the manner of conducting the naval war. Thus, for example, the French Captain Castex, an article in the Revue Maritime, as well as in his book, "Synthese de la guerre sousmarine," the naval historian Godey (1919), and Admiral de Bon (1921). The latter openly declares that this method of warfare is much more humane than large-scale war operations, that it has good chance for success and would have had for us, etc.

All of these defenders and advocates of the submarine commerce warfare hold the opinion that owing to the limited means of attack and defense possessed by these craft and their great vulnerability, it is an unreasonable requirement for these craft to be forced to stop, board, and search large and possibly armed merchantmen before they can be torpedoed by the submarine. To fulfill these conditions, except in extraordinary cases, does not lie within the nature of the submarine weapon; and these craft can not conduct commerce warfare in any other manner than that in which we were finally forced to carry on such operations. Had the Washington Conference after the war entirely forbidden commerce warfare with submarines, this might posssibly be adhered to, but since instead of that, such war-

fare was allowed, but encumbered with impossible conditions, the next war will see them wiped away. Of this more later. Before the war the situation was such that there was no international agreements in regard to the employment of submarines, which meant ultimately that the new weapon might and should be used in the manner demanded by the fundamental nature and peculiarity of the weapon itself.

The only attempt to restrict the employment of the submarine in time of war occurred during The Hague Conference on 31 May, 1899, after the proposal was made by Russia to forbid the employment of submersible warships. Germany, through its representative, agreed with this proposal in case it was accepted by the other powers (also Russia, Italy, Japan, and Denmark); however, America and Austria reserved the right to employ these boats in any manner they desired, while France and four of the smaller powers opposed the prohibition. England agreed to the prohibition provided all the other great powers would also agree to it, which, however, was not the case. Thus the vote of the conference was as indicated before, four smaller countries voted for the prohibition of submarines, while this was opposed by the vote of nine States, including America, France, and Austria. Three States, including Russia, did not vote on the matter. England, Germany, Italy, and Japan, which concurred in the prohibition, provided the other nations also entered into the agreement, could, therefore, not carry their point, and the whole submarine question remained open.

In the meeting of 5 June, 1899, the German delegate again asked if it were necessary to apply for further instructions regarding the submarine question, and this was answered in the negative by the presiding officer. In the plenary session of the Peace Conference of 1907 the question was not brought up again.

Thus the submarine was recognized in international law as an admissible weapon for warfare and might, for example, be employed to establish or break a blockade. That these craft might be employed in a manner best suited to the nature of the weapon and not in accordance with the requirements for surface craft, was also clear from the result of the negotiations, since it was exactly these peculiarities which first caused the question of their employment in war to be raised by the Russians. It followed further from these discussions that the submarine was recognized as having the status of a warship, and it was, therefore, in violation of international law that during the war these vessels were denied access to the waters under the jurisdiction of the neutral powers at the instigation of Great Britain. It was England herself who declared, at the second peace conference, in regard to the question of the con-

version of merchantmen, that there were two kinds of warships, "fighting ships and auxiliaries," and that by fighting ships should be understood all ships which were permitted to fly the recognized battle ensign which were fitted out at the expense of the State to attack enemy vessels, and whose officers and men were commissioned by the Government. Without doubt, the submarines come under this definition.

All agreements to the contrary which were made after the war did not apply to us at the time. It is also evident from the special interests of certain countries that in a future war where these interests are sharply opposed the State will not be bound, since ultimately every Government is in duty bound to make the utmost use of every means of defense at its disposal, if there is a possibility of winning the war thereby.

Of further interest is an article which appeared shortly before the war in an English monthly publication—the Strand Magazine—in the summer of 1914, entitled "Danger! A Story of England's Peril." The story, profusely illustrated with pretty pictures, describes a war between England and a small continental power possessing 16 submarines only, with the help of which the overseas commerce of Great Britain is destroyed and proud Albion is forced to sue for peace. As one can readily appreciate, the author, Sir Conan Doyle, easily accomplished his purpose—namely, that of calling the public attention to the danger to the island empire which threatened from a submarine war. Of interest to us, is only the fact that even in this place the ruthless employment of the submarines against the merchant marine was regarded as proper and justified. At that time in England the matter had not been driven home against their own interests and one was inclined to tolerate the employment of the submarines against merchantships, while later they raised a terrffic outcry against them, although they would have acted the same as we did if it had been possible for them to do so. Where opportunity for this did actually occur, for example, in the Marmora Sea, the Swedish and Dalmatian coast, they torpedoed passenger ships and hospital ships without warning. But that was, of course, something different. Then this did not occur on the part of the "Huns" but on the part of the "civilized nations," which were fighting against "barbarism." And what is to England's advantage is justified for all time and is in accordance with the will of God.

We will gladly concede that in this case the submarines were employed in the manner demanded by the peculiarity of the weapon. Only, what is right for one nation should also be conceded to another.

Chapter II

THE SUBMARINE WARFARE AND THE FOREIGN POLICY

In this connection we are unfortunately forced to quote from the words of Treitschke: "An army can not fight with indecision. Every war is radical in its nature and in many instances the efficiency of the troops can not prevail against the aimlessness and indecision of the political powers which they have to serve." However, we shall investigate the course of the political events which influenced the submarine warfare in its proper sequence.

On 19 August, 1914, we agreed with the proposal of America that the Declaration of London, which prohibited any military operations against the civil population should be binding on all the belligerents. England on the other hand refused and declared through the order in council of 20 August, 1914, that the doctrine of the continuous voyage should also apply to conditional contraband and that in the future it would not be necessary for English men of war to prove enemy destination of the goods in question. This might be carried out as circumstances required, and was to be applied particularly when the goods were consigned to a "person who was under the authority of any enemy State." What did that mean? Considerably more than a simple abrogation of the Declaration of London, which England had not ratified, but which she had fundamentally recognized in principle at the Hague Convention in 1909. This meant the beginning of the "hunger blockade" against Germany. Thus the list of conditional contraband included the particular implements and articles of food required for daily use of the civil population, which were then to be confiscated even though these were not destined for the use of the German men of war, since the term "under the authority of the enemy State" applies to every enemy individual. These articles and foodstuffs were to be, and actually were, confiscated, not only when they were consigned to Germany but in those cases where they might reach Germany through neutral countries.

Finally, in accordance with the pleasure of the Crown, it was decided that proof of this German destination was not required but that these goods could be confiscated at pleasure. This meant that aside from the intention of starving out Germany, the neutrals were also to be coerced, since in many cases their own goods were held

back. The reasons given by England for taking this step, namely, that the German Government had taken over the distribution of the entire food supply and that the measure was directed against the German Government and not against the civil population was absolutely untrue, since such a course was not undertaken by the Government until 1915, when this step was taken as a result of the English "hunger blockade." That the English measures were in violation of international law leaves no room for doubt; this was proven by the decisions of statesmen and jurists in connection with previous wars and the actions of England herself in the Russo-Japanese War. The German Government did not, either at that time or later, take full advantage of this breach of international law. True, they protested under date of 10 October, 1914, but accomplished nothing, since a new order in council was promulgated by England on 29 October, in which the measures in violation of international law contained in the order of 20 August were repeated. The fact that this order contained an addendum, that "for the rest" the provisions of the Declaration of London were effective, meant nothing under these circumstances. Further, England then transferred a number of articles from the free list to the list of conditional contraband, and some from that list to the list of absolute contraband; and thus began the curtailment of Germany's food supply in accordance with a prearranged plan—as proven by the rapidity with which these measures were adopted one after the other, and their intimate connection with the disposition of the fleet. To the measures undertaken with this end in view belongs the barricading of the southern North Sea by means of a mine barrier located at the northern exit of the English Channel and extending far out into the open North Sea, and the declaration of the entire North Sea—a free body of water—as a war zone (2 November, 1914). Both measures were justified by the English on the grounds that we had laid mine fields near the mouth of the Thames and that a submarine had sunk the English steamer *Glitra*, this being, however, no justification, since both these acts of ours were in accordance with the Declaration of London and the principles of international law, while the English disregarded both.

The English press now began to speak quite openly of a "blockade," although such measures are not recognized by international law as a "blockade," while the evident purpose of this measure was to force all North Sea traffic close to the English coast, into the "war channel," where it could be kept under their control without trouble or risk. England then still further extended this "blockade" as time went on until it was finally transferred to the shipping offices of the enemy and neutral world; a proceeding which was not only

easier and less dangerous but which offered greater possibilities for achieving the end in view. Legally, the "blockade" never really existed. Although Sir Edward Grey, in a note to the American Ambassador on 15 March, 1915, declared that the English fleet had established a blockade, in that all traffic to and from Germany was controlled by a cordon of cruisers. In reality no blockade was established, but this dangerous and troublesome measure was replaced by the orders in council which scorned all principles of international law. England was, in fact, unable to establish a blockade of Germany in accordance with the recognized provisions of international law, since the coast of the Baltic also belonged to the zone which would then have to be blockaded and further, they would have been forced to stop the German export trade, which they were unable to do. America had repeatedly invited the attention of England to the fact that a blockade of Germany did not exist either "de jure" or "de facto" (particularly on 5 November, 1915), whereupon England changed her tactics, and on 5 January, 1916, published "Measures for the restriction of German overseas trade." In this "white book," which shifted the war against Germany to the shipping concerns of the neutrals and which constituted the worst possible coercion of the neutral powers themselves, the term "blockade" was very cleverly avoided. However, this expression cropped up accidentally from time to time, although the English should have carefully avoided its use. So much for the English "blockade." Now back to the year 1914.

It is entirely probable that the leaders in Germany, being little trained in military and naval matters, were unable to comprehend the English operations at sea as a whole, and, therefore, the most important part of their war plan, which was the final destruction of Germany by means of industrial strangulation and the starvation of the population. One must concede that the Government might not recognize the fact that the barricading of both entrances to the North Sea—by means of mine barriers and patrols in the South and the shift of the fleet to the northward—the declaration of the North Sea as a war zone, and the deliberate misconstruction of the Declaration of London were all together inseparable parts of their basic plan. Less comprehensible is the fact that they did not enter an energetic protest against the undisguised expressions of the English ministers in authority and take measures in retaliation. Of these, only a few will be recorded here owing to lack of space. In a guildhall speech on 9 November, 1914, the English Minister for the Navy openly designated the goal of the war as "business as usual" for England, and for Germany "economic stringency." Even in September, 1914, when the negotiators from Holland were in London

to protest against the commerce reprisals taken against that country, Minister Runciman declared quite openly that the object of these measures was the starvation of Germany and that these should and must remain effective. This speech was clear enough. Even though we disregard the operations at sea, the rapidity with which the control of neutral commerce was taken over should make it clear to us that we were facing a well-prepared war plan on the part of the English, which they would never abandon, since it embodied not only a certain means of success but, according to English opinion, was the only possible method of obtaining a victory. Immediately after the outbreak of the war the regulation of neutral goods by English officials was inaugurated; neutrals were forbidden to export to Germany, and even products from their own colonies were confiscated, etc. Did not these compulsory measures speak as clearly as the words uttered by the English minister?

It must have been clear to the German Government where all this was leading, as well as the fact that the British war plan was certain to succeed if the war lasted for several years—i. e., long enough to starve us out. He who believed in those days that the war would end after a short campaign on land had, in my opinion, either not studied naval history or had failed to understand its lessons. But that is just the point that was shown us even more clearly after the war than before—the German Nation has never understood the sea (Tirpitz)—and, it may be added, this was especially true of the political leaders.

However, it is a fact that we just then began to realize what a weapon we had with the submarine, although a threat of submarine warfare in the fall of 1914 would have been premature and disastrous, even though we had been able to realize this in its entirety. But in no event should our diplomacy have contented itself with paper protests, which they must have realized were useless, but should have branded these English measures as violations of international law, which would be vindicated, and protected themselves in this manner. The method of doing this could have been left to the future, but we should have then and there protected and safeguarded the freedom of commerce for ourselves, and thus prevented the situation, in which later the world and America especially represented us as the nation which first deviated from the principles of international rights at sea.

The first instigation for a practical counter offensive against the English plan of starvation—a threat of submarine commerce warfare which was to be initiated immediately - originated with the High Seas Fleet in November, 1914. This was not based on the fancy of a Conan Doyle, or the idea of Sir Percy Scott, Lord Fisher,

or Admiral Aube, but originated rather from the practical experiences of the submarines themselves, which since their first offensive in August, 1914, had noticed the uninterrupted stream of commerce which was flowing toward England, and were personally convinced that the possibilities of attack on this shipping by means of the submarines should be turned to advantage. The force of this idea, which was based on the personal observation of the proponents, broke down the initial opposition of the commander in chief of the fleet. Even the naval staff agreed with the idea—at least basically—but held that the time for starting such operations was not yet ripe. In so far as this decision was based on technical grounds, one must concede it to have been correct. The submarines were then lacking in war experience and a large number of them were then undergoing repairs, since the war took us by surprise. Further, there were then exceptional demands of the army, whose advance into Flanders had been halted by the enemy fire on the flank from the sea, while finally a number of the submarine torpedo tubes had to be rebuilt to accommodate the ships' torpedoes. (As a result of a lack of submarine torpedoes. The ship torpedoes could not be used in the submarines without alteration of the tubes, owing to the difference in caliber.) From this time on, the influence of the Bethmann policy in the conduct of the war was felt by the submarine service. The chancellor feared that the submarine commerce warfare against England would force that country to adopt even more stringent measures against German trade, although since that was part of the English war plan, it was to be expected any way; and further he feared that the neutral powers would be compelled to join forces with England, a fear which subsequent events proved to be groundless.

He would not agree to the contingent proposal of a blockade of the French coast by means of submarines, since that would hinder the American efforts to continue their food relief for Belgium. The real reason for his obstructive attitude was, as is well known, his conciliatory policy toward Great Britain, a continuation of his friendly policy toward England from the pre-war times, from which he was never able to entirely free himself, although on the outbreak of the war he himself was forced to admit that his diplomacy built on this basis had "collapsed like a house of cards." Throughout the whole war, the necessity for the submarine warfare on the one hand and the efforts of the Chancellor on the other "not to exasperate England" resulted in half measures, which continuously endangered the success of the submarine warfare; and finally resulted in robbing this weapon of the final decision, although there were in fact other contributory causes.

In spite of the opposition of Bethmann, the naval staff succeeded in a remarkable manner in obtaining from the Foreign Office at the end of January, 1915, authority for the initiation of submarine commerce warfare, a surprising achievement which, owing to the fundamental opposition of the views of the officials concerned, can only be explained on the grounds of a misapprehension in regard to the whole question.

The German Official Gazette and Royal Prussian Gazette of 4 February, 1915, published the following announcement (declaration of war zone):

1. The waters surrounding Great Britain and Ireland, including the entire English Channel, are hereby declared to be a war zone. From 18 February, 1915, on, every enemy merchant ship encountered in these waters will be destroyed, without it being possible, in every case, for the danger threatening passengers and crew to be averted.

2. Even neutral vessels run the danger in this war zone of falling a victim to the attacks intended for enemy ships and the accidents incident to naval warfare, owing to the authorized misuse of neutral flags on the part of the British Government.

3. Shipping passing to the northward of the Shetland Islands, in the eastern areas of the North Sea, and in a strip at least 30 miles wide along the coast of Holland, is not in danger.

(Signed) Chief of the Naval Staff
v. Pohl.

Berlin, *4 February, 1915.*

There was thus a respite of 14 days given before opening the submarine commerce warfare which was conceded out of regard for neutrals, a measure of doubtful value. This declaration was supplemented by a memorandum which was furnished to all powers, in which the German Government justified its position on the basis of the violations of international law on the part of the English Government, but this memorandum gave the impression of an apology. But when one attempts to justify his own position by a recital of the illegal measures on the part of the enemy, this still does not vindicate one's own counter offensive measures: it were better had the basis for these measures been given as the peculiar nature of the submarine. Under these conditions, we would then have been able to force a show down. The most questionable point was the fact that a distinction was made between enemy and neutral ships, since this indicated that the latter would be spared as much as possible, while this was an impossible condition for the submarines on account of the British misuse of neutral flags. This meant that the submarines were to be unfairly exposed to danger, which in the nature of their construction they could not counter, while the peculiar nature of the submarine weapon was denied from the start. In this lay a grave fundamental error, which could never

be rectified. That was the proper moment to fight once and for all time for the rights of the submarine as demanded by the nature of their construction. This, however, was neglected.

The important decision to commence the submarine warfare on 10 February, 1915, was taken at a meeting with the chancellor on 2 February and was agreed to by the Foreign Office, while on 4 February it received the approval of the Kaiser. Looking back on the matter at this time, one is inclined to doubt that this was a very happy decision, in view of the fact that the following period showed that they could not have been fully cognizant of the far-reaching political effects of this decision, nor was the necessary matériel for the purpose in readiness. Admiral von Tirpitz, Secretary of the Navy, who was charged with providing the matériel, did not take part in the discussion when the decision was reached. The latter held the opinion that the submarine warfare against enemy commerce should be carried out on a large scale, and that for the time being a test of strength by means of a submarine blockade of the Thames was preferable. While it was certainly true that the submarine operations should be initiated as soon as possible, it must be doubted if this was possible at that time. That such an important decision could have been reached without the cooperation of all officials directly concerned, simply proves the lamentable state of decentralization which existed at the time, even within the navy itself. Not until the last year of the war was centralization obtained in the navy, while in so far as unity of command was concerned, this was never attained (coordination of army, navy, Foreign Office, industry, etc.). And still we are still supposed to have "prepared" the World War. Have we learned anything from these past events? It is true that the delays which resulted from the lack of proper organization did not exert a decisive influence on the outcome of the war, but this was due entirely to the mutual good will of the officials concerned. It is also true that other very important and influential factors finally led to the collapse and loss of the war, but is not the only justification of past errors the fact that one can profit by these mistakes? For this reason, the faults of our organization at that time shall not be passed over; still less, since our present organization—in spite of the superficial coordination of the army and navy—is incapable of meeting the demands of a large war, into which we might be drawn at any time against our will and in spite of our impotence.

In the navy, this decision was greeted with joy, but soon water was to be poured into our wine. That, for which the naval staff should have been prepared, soon occurred. The neutral powers protested, among which the most energetic protest was from the United

States of America, which on 12 February, 1915, stated that the German Government would be held strictly accountable for any violation of neutrality against American ships and forbade any restriction to American commerce: regarding the unneutral commerce in munitions in which the United States was then engaged the note was naturally silent. The frightened Chancellor, without consulting the naval authorities, immediately appealed to the Kaiser for a postponement of this submarine warfare which should then only be initiated on special orders (15 February, 1915). Thereupon, the navy was asked to undertake the responsibility of forcing England to capitulate within six weeks by means of the submarine warfare, a demand which they were incapable of fulfilling and which they naturally could not promise. The answer to the American note of 12 February occurred in detail in the reply dispatched on 16 February. Germany justified her position again, in a thorough and detailed manner, but said—and here lay the error—that American ships would be spared. In the other, better composed part of the answering note, it was suggested that America persuade England to reestablish the provisions of the Declaration of London, whereupon Germany would comply with the new state of affairs. By this note, the backbone of the submarine commerce warfare was broken from the start, since what had been promised to America could not be withheld from the other neutrals, in particular Italy, which country it was feared might then join the Entente. Thus on 19 February the submarines were ordered to spare American and Italian ships, and in this curtailed form the submarine commerce warfare was begun on 22 February, 1915. The deplorable manner in which this arrangement was concluded showed clearly that the Foreign Office had basically misunderstood the intentions of the naval staff. The latter meant by the proclamation of 4 February to go the whole distance—i. e., to impose their will on neutral shipping by force. The Foreign Office, on the other hand, had assured for themselves freedom of action in this respect and now took the open line of retreat. The naval authorities naturally felt that they had been forced into an unfavorable position, but their personal protests and reports were only able to bring about an extension of the submarine warfare—which up to then had been restricted to the channel and the North Sea—to the west coast of England, while the Danish and Swedish traffic in the North Sea should be restricted to narrow natural security lanes.

What should have been done? With reference to the peculiar nature of the submarine weapon, we should have firmly and positively refused to accept the demands made in the American note. The German-American friendship at that time had not been weakened by the loans and munition supplies which later served to

strengthen the Anglo-American entente, while the opponents of war in Congress and in the Government itself (Bryan) had not been won over to the cause of the Allies; in fact, the unneutral attitude of England had created a very unfavorable impression in America and could have been used to our advantage. At that time Wilson could not have drawn the population into the war. But Bethmann Hollweg sacrificed the fundamental principles of the submarine employment to his exaggerated misgivings with the vague hope of obtaining America's help by a conciliatory policy, whereby an understanding might be reached with England—the goal, which lay at the root of all his diplomacy. One must admit in fact, that this policy of conciliation was made very much easier for the Chancellor as a result of the previously described interpretation placed on the proclamation of 4 February. Had the naval staff at the time formulated their demands in clear, unmistakable terms, admitting of no distinction between enemy and neutral vessels, the Chancellor would have been cut off from this disastrous line of retreat.

It must be conceded to the credit of the American Government that they actually made an effort along the lines desired by us, in that on 22 February the same note was dispatched to Germany and England, in which, aside from other matters, they proposed a submarine warfare in accordance with the rules for prizes, while on the other hand England should place food supplies on the list of articles free from confiscation. The German Government accepted this proposal (note of 28 February) while the British rejected the American proposal (in a memorandum of 13 March, 1915). In this memorandum they did not touch on the American proposal, but restricted themselves to a recital of the German acts of violence since the outbreak of the war which they gave as grounds for the "hunger blockade." This corresponded more nearly to the German ideas of right (sic) and spared the neutral powers more than the German procedure. One can see from the development of each phase in the exchange of notes how the situation was turned upside down; that they were filled with positive misstatements, parenthetically interjected. In reality these notes were to serve to hang a mantel of past justification over their real plan, conceived some time past, to starve out Germany.

The main thing for us is the fact that these attempts at mediation on the part of America were thankfully received in Germany, while in England they fell on stony ground as did all other protests and proposals on the part of the United States which were mostly signed by Bryan. One can not doubt the good will of America at that time, but in the exchange of notes it is character-

istic that on the one side (America) was regularly contented with small unavoidable concessions, while on the other hand (England) remained firm in holding to the fundamental questions of "blockade" and "measures of reprisal." There the matter was forced to rest. Thereupon England proceeded undisturbed to strengthen her measures for starvation. To recount all the orders in council which were promulgated with this end in view is not the intention of the author, as this book is intended for a larger circle of readers and the recital would be too lengthy. In regard to this matter, it will only be stated here that as time went on there was left no single article which could not be seized at the pleasure of the British, whether in neutral ships at sea, which were brought into British harbors for control, or in neutral harbors where the shipping was held under the control of firms under English authority or by English officials. To be noted here is the weakness displayed by the neutral powers in yielding to this pressure from the British; even the "black list" was respected and the boycott against firms dealing with Germany was made effective.

The German submarine warfare meanwhile continued its emaciated existence in the leading strings of our diplomacy.

As a result of the great losses in the submarine service, His Majesty, the Kaiser, on 2 April, 1915, prohibited the submarines from coming to the surface to determine the nationality of the vessel, whereby the submarine was left entirely in the dark in so far as concerned carrying out the orders to spare certain neutral vessels, without renouncing all chances of success.

In April, 1915, as result of the sinking of the Dutch steamer *Katwijk* and the corresponding agitation in Holland over the incident, the submarines were ordered to spare all neutral vessels following a note of apology to the Dutch Government on 18 April; while these orders were again issued in more stringent form on 29 April (*Nebraska* incident). It came about practically that all these restrictive orders were issued by general headquarters and were instigated by Bethmann Hollweg. The military commanders of the submarine forces would never have issued such orders, since they could not be carried out by the submarines. What did the execution of the last-mentioned order mean? The end of the submarine warfare against enemy commerce. The submarines, which were then partly armed, did not and were not permitted to come to the surface to investigate the steamer, and were forced to allow every ship with neutral flag to pass, with very few exceptions, in which cases the ship's type could not be disguised by any scheme of deception. But this was the purpose which Bethmann Hollweg sought to obtain and which became more and more evident in the

course of time, and in the achievement of which he was supported by our foreign diplomatic representatives, particularly Count Bernstorff in Washington, and at the home of the highest authorities in the Ministry and the Cabinet. Even the chief of the general staff, von Falkenhayn, then followed in the wake of the Bethmann policy, though impelled by military consideration which forced him to agree with the Chancellor's desire to avoid conflict with neutrals. (Due particularly to the lack of troops, which made any conflict with the neighboring neutrals at that time appear undesirable.) But the end that the Chancellor strove to attain was not accomplished by these restrictive orders, since, though he rendered the submarine warfare practically ineffective, the source of conflict due to the possibility of error still threatened, and instead of being decreased was, on the contrary, actually increased thereby.

The number of orders issued to the submarines operating in the North Sea were so large—most of them as a result of diplomatic reasons—that they totaled 146, and to recount them here would make the book unreadable. Soon the submarine commanders were not able to get about on account of the mass of papers. On these rested the principal crisis encountered in the submarine commerce war.

On 7 May the large English passenger liner *Lusitania* was sunk by the *U–20* off the south coast of Ireland. This was an enemy ship, which in accordance with our declaration of a war zone, could have been sunk without warning; and the ship was thereupon torpedoed since it was known to us that the ship was destined by the Admiralty for employment as an auxiliary cruiser and had been fitted out as such. It is known further that Count Bernstorff issued a warning in the newspapers against Americans in particular taking passage on this ship, which was bound for the war zone and was under the jurisdiction of a power at war with Germany. In this attack about 1,200 people lost their lives, of which over 100 were American citizens. In spite of the fact that the rapid sinking of the ship was due to faulty construction and the great loss of life attributed to lack of life-saving material—life boats, life preservers, etc.—and further, aside from 2,000 people, the *Lusitania* was also carrying munitions, the British succeeded through their propaganda in the press, in making this appear as an American question and thus loosen against Germany a storm of indignation and protest, since in this manner the English would attain greater freedom for the passage of their ships and could then be spared the necessity of employing convoying flotillas (the presence of which, incidentally, would have served to reduce the great loss of life resulting). The American Government fell in only too gladly with the British wishes and thereupon directed a sharp note to Berlin, demanding repara-

tions for the damage, and that measures be taken to prevent the recurrence of such incidents in the future. In this note they formulated the remarkable doctrine that American citizens were to be allowed to travel anywhere at sea even during the war in the pursuit of their lawful occupations, without being subjected to danger. Whether women and children could accompany them was not stated; but it is an open question why this principle was not also applied to the mainland in the theater of war; that would have been a real task. In their answering note of 28 May the German Government pointed out that the submarines were forced to resort to sinking without warning, in view of the orders given by the British Government for passenger ships to attack the submarines, and the practice of giving rewards for such sinking of submarines as well as the known misuse of neutral flags which prevented the submarines from investigating the vessel on the surface. The *Lusitania* was armed and had munitions on board, a circumstance which was in violation of the American laws regarding passenger vessels and which the German Government could not permit in the interest of their army. Under these circumstances, the German Government was forced to hold back a final answer to the note, since the presence of the munitions appeared to be responsible for the rapid sinking of the vessel and the great loss of life.

This note, which should better have simply stood on our rights in sinking this vessel instead of being based on facts which we were not then in a position to fully prove, was simply rejected by the American Government, on 10 June, 1915. Our information was stated to be in error, even in regard to the munitions which was supposed to be on board, while for the rest, our procedure was not warranted by the question of the legality of this shipment. The *Lusitania* was primarily a "passenger ship," and it was again repeated that American citizens had the right to travel anywhere upon the high seas and even in enemy ships without molestation, while in the case of neutral vessels it was necessary to establish the fact that they were actually carrying contraband of war before they could be sunk.

Meanwhile, the Chancellor, in spite of the conciliatory note sent in answer on 28 May, was inclined to give ground, and regardless of the protests of the leading naval authorities, succeeded in obtaining an order from the Kaiser prohibiting the sinking of any large passenger vessels, even enemy ships, by our submarines. (Order No. 24 of 5 June, 1915.) With this order the submarines received their second blow, which was all the more effective since this type of vessel was especially suited for the quick transport of troops and munitions. The Secretary of the Navy, Admiral von Tirpitz, and the chief of the naval staff, Admiral Bachmann, whose

opposing reasons had not been recognized by the Chancellor, and who had gone over their heads in bringing about the order from the Kaiser in regard to submarine procedure, realizing that any further concessions would mean the end of the submarine campaign once begun, thereupon tendered their resignations; which, however were not accepted.

After another note had been received from the American Government on 10 June, 1915, demanding that measures be taken for the security of American passengers in the war zone, the Chancellor was in the position—agreeable to him—to give the necessary assurance; this was to hold good for neutral and even enemy ships which had been transferred to American registry, whereby the German Government expressed the hope that these vessels would not be used to carry contraband. As was to be expected, these concessions met with no response. The American Government expressed itself as "bitterly disappointed" that these fundamental humane considerations were not extended to all neutral ships, that the submarine warfare could be carried on even with the retention of these ships, designated the attitude of England on which we based practically our entire justification for this procedure as irrelevant, and reproached the German Government—unfortunately, with a certain amount of justice—that the privilege of retaliation, which we always brought up, was a concession of the illegality of our methods of procedure. In the future the American Government would regard any violation of neutral rights whereby American citizens were jeopardized as a deliberately unfriendly act. This concluded for the time being the exchange of notes on the *Lusitania* incident. It is unnecessary to point out how one-sidedly this last note demanded the rights of humanity for the Americans and neutral powers, while evidently the German civil population was to be excluded from any such privilege. Above all, this note shows even more plainly how futile was our procedure in trying to base our program on the plea of retaliation instead of on the special nature of the submarine weapon. In doing so, we not only injured our own position but jeopardized the future of the submarine to a grave extent.

As a result of these concessions and the resultant ambiguity of the orders—since how could a submarine commander always distinguish with certainty between a passenger steamer and a freighter?—another accident soon occurred: on 19 August, 1915, the steamer *Arabic*, a much smaller ship than the *Lusitania*, was sunk by the *U–24*. Again it was an enemy ship which bore down on the submarine while the latter was just about to sink another steamer. As a result the submarine was unable to recognize this vessel in time as a passenger ship, and further felt itself threatened by the

otherwise inexplicable procedure of this steamer. As a matter of chance it happened that there were eight American citizens aboard this vessel, of whom three were drowned. The exchange of opinions in this matter was conducted through the ambassadors, Count Bernstorff and the American Ambassador Gerard, to which is to be attributed the fact that no official notes were published. The tragic result of this incident was that from that time on no passenger ships whatever were to be sunk, even small vessels. (Submarine Orders No. 27 and 29.) The German ambassador in Washington, Count Bernstorff, condemned the attitude of the submarine commanders from the start and represented them to the American Government as the guilty parties, a procedure which was not justified by military law nor was it to our own best interests.

The transactions in general headquarters in this connection were highly characteristic of the lack of unity of command. Thus it happened that the admirals concerned took their leave from Pless with the distinct understanding from the Kaiser that the fundamental principles of the submarine warfare should not be further sacrificed and that no further concessions should be made by Count Bernstorff (26 August); but they had scarcely reached Berlin when they were informed by the Foreign Office that the note of apology with the above-noted concessions had already been dispatched to Washington (27 August). In the absence of the admirals, the Chancellor had succeeded in precipitating a decision to the contrary.

The admirals concerned (von Tirpitz and Bachmann) thereupon asked to be relieved from their posts as a result of the action of the Chancellor and in the case of the chief of the naval staff this request was granted. He was assigned as commandant of the Baltic Naval District. The Chancellor obtained a complete victory, in that Admiral von Tirpitz was thereafter excluded from participation in all discussions of foreign policy. The hand of the naval cabinet (von Muller) is particularly noticeable in this disastrous event. Admiral von Holtzendorff (retired), a weaker and more easily swayed personality, was then named as chief of the naval staff. Also, Admiral von Pohl, the commander in chief of the fleet, asked for his detachment, as he could not prosecute the submarine warfare under those conditions. However, he unfortunately did not hold to his decision, but allowed himself to be persuaded by the naval cabinet that he could not properly comprehend the political situation in its entirety.

The submarine warfare, in accordance with the aims of the diplomatic negotiators, was thereupon rendered practically ineffective.

Neutral steamers might not and could not be sunk, nor could any passenger-carrying steamers be sunk. What remained? Small enemy freighters (tramps), enemy fishing vessels, and coastwise steamers. The correct procedure would have been to abandon the submarine warfare as hopeless; but this did not meet with the plans of the Chancellor, who wished to avoid any real offensive, and at the same time desired to pose before the German people as a strong character. The Secretary of State, von Jagow, in his speech to the Reichstag on 15 August declared that we would not be led astray in the conduct of the submarine warfare by America—i. e., on the same day that the Chancellor had long since decided to grant every concession in this case.

In this attitude he was strengthened by the army, since von Falkenhayn was also in favor of yielding for technical reasons. Since even general headquarters could not be made to appreciate that the submarine warfare had become practically ineffective, while the possibility of further "accidents" still existed, and in the words of the Chancellor, we were "living on a volcano," the submarine warfare in the English Channel and on the west coast of England was entirely prohibited, while in the North Sea it was only permitted in accordance with the rules for prizes.

The sinking of the American steamer *Hesperian* seems to have played a part in bringing about this unholy order (Submarine Order No. 31). As for the commander in chief of the fleet, there remained nothing but to abandon completely any further efforts to carry on submarine commerce warfare; with which decision he hoped to bring pressure to bear on the political leaders. For the time being he then employed the submarines for strictly military operations. This procedure was designated as faulty (this included the submarines in Flanders, although the mine-laying submarines continued operations), since it was considered that commerce warfare in accordance with the rule for prizes would have been better than nothing at all, as the loss of this shipping tonnage at that time would have been just sufficient to permit the complete destruction of enemy commerce later on. One must also realize the fact, however, that the risk to the submarines was hardly worth the effort, as the English had meanwhile very much strengthened their North Sea patrol. The ruthless murder of the entire personnel of the *U–27* (Lieutenant Wegener) by the captain and crew of one of these patrol vessels (*Baralong*) on 19 August, 1915, showed the danger of conducting submarine warfare in this manner (rules for prizes) and exposed the unscrupulous methods of the enemy.

In the North Sea, therefore, the submarine warfare came to a complete standstill, and was only continued in the Mediterranean.

where there was little danger of drowning American bankers and killing American dealers in war materials. The torpedoing of passenger ships was also prohibited in that zone, but not until December, 1915.

The jubilation in the foreign press should have made clear to the German Government what had been accomplished by these concessions, but for the time being no action was taken, although the navy did attempt to revive the submarine warfare. These officers then found support from the army (General Falkenhayn, Minister of War von Hohenborn) after Bulgaria had entered the war on our side, subject to the condition, however, that the navy should guarantee to end the war within six months if all restrictions imposed on the submarine were withdrawn.

Toward the close of the year 1915 there were important conferences in the War Ministry, in the course of which the naval authorities declared that under the desired conditions the war could be ended within six months by a blockade of the English commerce, whereupon von Falkenhayn announced himself in favor of the unrestricted warfare, with the understanding that the war was to be ended during the year 1916, if we were to achieve a peace which would bring security for the future. It was first decided that this was to begin, if possible, on 1 February, 1916, but owing to political obstruction the time was postponed to the 1st of March, then to 1 April, and still further delayed. The chancellor as well as the army were both thoroughly informed, orally and by memorandum from the naval staff and the Navy Department, regarding the possibilities of success—the average sinkings per month were estimated at 631,640 tons in accordance with previous war experience—and further the necessity for an early commencement of this warfare was clearly shown. In the second memorandum of 12 February, 1916, a number of technical experts in industrial circles expressed their concurrence and all promised success for this submarine warfare, provided it were started at once. These experts were prominent in the financial, industrial, and commercial world and were well informed regarding industrial conditions in England. Aside from these the Secretary of the Treasury (Helfferich) was asked by Bethmann to give his opinion on this memorandum; and while he expressed some doubts, which were justified in so far as these were concerned, he still believed that the unrestricted submarine warfare must be resorted to in the end, and that, therefore, any postponement would be detrimental. Meanwhile the naval staff made the further attempt to be allowed at least to resume the submarine warfare against armed merchant ships. The approval of the Kaiser was obtained for this on 29 January, 1916, but was soon weakened

to such an extent by the numerous conditions imposed that in the North Sea and in Flanders (11 March and 16 March, 1916) this method of warfare was again ended by submarine orders Nos. 41 and 43, which required that only merchant ships known to be armed which were in the war zone could be torpedoed, while passenger steamers were to be spared in all zones whether armed or not. As one can readily see, this was an order which could not be carried out and was only issued to prevent the submarine warfare from reaching complete stagnation.

The conference between the army and navy officials on 4 March, 1916, regarding the unrestricted submarine warfare, took place in the presence of the Chancellor, whereupon the latter spoke against this procedure, while von Falkenhayn was in favor of it. Since the Chancellor expressed grave misgivings with regard to America, the chief of the naval staff then interceded with a proposal whereby the fundamental principles of the submarine warfare were to be retained, but that public opinion in America should first be prepared for this step. Entirely aside from the fact that this conciliatory proposal was extremely difficult and probably impossible of accomplishment, the natural result of this proposal was, for the time being, a postponement of the submarine warfare which was later to prove disastrous, since the spring and summer of 1916 was in fact the most favorable time for the commencement of this unrestricted warfare, and this opportunity was lost. Later, our lack of food supplies began to be felt, domestic political troubles increased, which were not unknown to the enemy, who meantime had found time to strengthen his counter offensive; in short, our situation was rapidly becoming worse, and therefore it was an absurdity for the six months period of submarine warfare for which the naval staff promised success on 5 January, 1916, to be carried over without change to the year 1917. Although the average monthly sinkings estimated early in 1916 at 631,640 tons might still have been attained in the year 1917, still this amount of tonnage sunk could not be expected to exert the same influence on the final result when postponed for one year. In no case should we have given our political demagogues such a weapon for agitation as the failure of this distorted promise later furnished them.

Grand Admiral von Tirpitz, who had particularly supported the Chief of the Naval Cabinet, Admiral von Muller, in his participation in the decisive conference of 4 March, 1916, obtained only a rebuff and then reported himself ill. His resignation was requested, which was thereupon tendered and accepted on 17 March. This lamentable occurrence was a severe blow to our national prestige abroad, as evidenced by the jubilation and scorn of the foreign

press; while it was to be regretted that the Kaiser, who had recognized in Tirpitz an exceptionally powerful personality, should have sacrificed him for a Bethmann Hollweg. The latter was praised by the foreign press as a regular matter, while they slandered Tirpitz and evidently feared him. But whosoever acts in accordance with the wishes of the enemy is violating his own best interests. In this case, domestic political reasons turned the scale.

One very important question is, whether or not the United States of America would have declared war on us in the spring of 1916, had we begun the unrestricted submarine warfare at that time; whereby we must remember that we would have had to accept this risk, since we did not dare relinquish our last possible means of obtaining a victory. I should answer the question in the negative. In spite of the very suspicious policy of President Wilson, which scarcely permitted a doubt as to his warlike intentions, and the fact that America was even then making secret preparations for war, it is highly improbable that public sentiment and the opinion of Congress was ready to support such a step on the part of the Government in the spring of 1916. Even on January 10, 1916, Lansing had proposed to the Allied Powers to abandon the arming of merchant vessels, since such a course was difficult to justify and would lead to offensive operations against merchantmen. Had he succeeded with this proposal, we should have been able to conduct the submarine warfare successfully in accordance with the rules for prizes. In February, 1916, one of the Members of Congress in an open letter accused the Government of unneutral acts against Germany in 20 specific instances (open letter of Senator Stone). At the same time, in both Houses of Congress, a resolution was proposed warning American citizens against traveling on armed merchant ships. Even though this resolution was "laid on the table," one may still assume from these facts that President Wilson did not enjoy the necessary support in his desire for war at that time. At the same time he himself was forced in regard to the American protest against the introduction of the reported "blacklist" by England, on July 28, 1916, to make the accusation that that "country had only too frequently and lightly disregarded the exact requirements laid down by international usage and agreement."

Enough of that. In any event, on our side, the Chancellor with his fear of America and his policy of friendship for England, was able to oppose the demands of military necessity. Thus the last chance to save the Empire was lost.

As a result of the orders for ruthless offensive measures against armed enemy merchantmen, the submarine warfare was again revived to some extent, and brought passable results, even though many steamers were allowed to escape (more than could be sunk).

The sentiments of the submarine commanders, as a result of the impotence imposed on them, may easily be imagined, since all of them were convinced of the disaster of the half measures, under which they and their crews were forced to suffer. The half measures which were ordered led, on March 24, 1916, to another of these "accidents" which were so much feared by the Chancellor and the Foreign Office, when the French liner *Sussex* was sunk in the English Channel. The large number of men in uniform on the decks of this vessel led the submarine commander to the conclusion that this was a troop transport, while in reality it was a large passenger ship which was evidently employed by some of the military personnel for passage from England to France. Since among the 80 persons who lost their lives in this case there was an American citizen, the American Government directed another note to Germany through their ambassador in Berlin as soon as the torpedoing of the vessel had been established. This was followed by the famous "knockout note" (Tirpitz) under date of April 20, 1916. In this it was declared that the answer of the German Government under date of April 10 was unacceptable, that the submarine warfare of Germany was in violation of the rights of humanity and international law, and that in case the German Government persisted in this course, the American Government would be forced to break off diplomatic relations. On April 22 President Wilson, in his address to Congress, based his actions on the ground that America was the champion of the rights of the neutrals and must, therefore, see that proper conception of the rights of humanity prevailed; unfortunately, he did not champion the humanitarian rights of the German population. He expressed the hope that Germany would see the error of her ways and that a breach with that country might be avoided; whereupon, the House broke out in applause. No war spirit was apparent.

Naturally, the Chancellor immediately set all machinery in motion to make it impossible for a vessel to be torpedoed without warning in the future, and on 24 April the High Seas Fleet and the bases in Flanders were ordered to conduct submarine warfare only in accordance with the rules for prizes; whereupon, both commanders ordered the submarine warfare to be suspended entirely (Submarine Orders No. 46). This arbitrary order, which was at first a protest against the concessions of the Government, was intended to bring pressure to bear for the revocation of the order, but was approved by the Kaiser on 30 June, whereupon the submarines were ordered employed for strictly military operations. The submarine operations in the Mediterranean were scarcely disturbed by these orders and continued practically as before. As a result of the recession

of the Government from their position in the *Sussex* incident, General von Falkenhayn, who alone proposed the initiation of the unrestricted submarine warfare as the only possible answer to the American note, then tendered his resignation. The submarine commander was punished by the Kaiser himself (Admiral von Muller, Chief of the Naval Cabinet) as the immediate superiors hesitated to do so, since in accordance with military law, the submarine commander was in the right, and further, all submarine commanders had been specifically promised protection in the event of a mistake being made.

On May 4, 1916, the German Government informed the United States that the submarine campaign in the war zone would be conducted in accordance with the general principles of international law regarding the search, seizure, and sinking of vessels, and that no merchant ships would be sunk without warning. It was further stated, however, that England had first violated all humanitarian rights by their warfare on the civil population of Germany, and expressed the hope that America would be able to bring England to the acceptance of these principles. Should this not be successful, Germany would feel justified in reaching a new decision. This was answered with the short statement that the respect of the German Government for rights of American citizens could not and should not be made dependent on the attitude of other powers. Thus, every intercession with the British Government in our sense was abruptly refused. The expected reward which the Chancellor hoped to obtain by his policy of conciliation was lost. Wilson's diplomacy had been completely successful and his prestige in Congress was enormously increased.

The submarine commerce warfare was entirely suspended during the summer (five months) in the High Seas Fleet, and not quite so long in Flanders. The efforts of the naval staff to revive the submarine warfare in accordance with the rule for prizes in the northern waters, which might bring some little result, was shattered on the firm determination of the fleet commander, who hoped in this manner to bring the Government sooner to resume the unrestricted submarine war. The stand of the commander in chief of the fleet against the submarine warfare in accordance with the rule for prizes was essentially correct, and in the interests of the submarine personnel, it was finally successful in achieving the desired purpose. On the other hand, the lack of sinkings which for the five months had been estimated at 1,500,000 tons, would have been a considerable factor not to be underestimated. Conciliatory plans on the part of the naval staff (such as submarine blockade around England, ruthless submarine campaign against troop transports in the English

Channel) were put forward in personal interviews, but were blocked by the Chancellor, who was supported in this case by the chief of the general staff out of fear of America.

The military operations of the submarines in the meanwhile (with the High Seas Fleet) were in reality a waste of time and strength as compared to the results which might have been accomplished by commerce warfare; but this, however, could not have been easily foreseen at the time. The submarines at that time could not be employed in close tactical cooperation with the fleet, but could only be used in waiting stations, etc., whereby no great success could be expected, as, for instance, at the Battle of Jutland (31 May) which occurred at about this time. This is, however, an incidental matter.

Meanwhile (29 August, 1916) in Pless (general headquarters) the command of the army had been given to Hindenburg and Ludendorff. The latter had already realized that the navy could only support the army properly provided the submarines were permitted to operate against neutral as well as enemy commerce, and he held the unrestricted submarine warfare to be not only proper but justified on the grounds of the requirements for food. In spite of this, however, in the grand conference which took place on 3 September, 1916, as a result of the proposal of the naval staff to renew the unrestricted submarine commerce warfare, the opposition of the Chancellor, with whom a preliminary conference had been held on 30 August, could not be overcome. In the discussion, the Chancellor held up the danger of war with Holland and Denmark, and the army commanders were forced with a heavy heart to accept the veto of the Chancellor, since they could not spare the troops for military operations against these countries. They seconded the motion of the naval authorities in the matter, however, while Jagow and Helfferich supported the Chancellor. Finally, the conference ended with the partial understanding that the submarine warfare would still be decided on at some future date, since the Chancellor recognized its necessity and declared he would give it his approval as soon as he could be convinced of its ultimate success. Meanwhile, the decision to open the submarine campaign was not taken since the minister of war was in favor of waiting (on account of Roumania) and the Chancellor declared the necessity of not only making inquiry regarding the matter of the German allies but also Parliament. The principal result of the conference was a further disastrous postponement of the submarine warfare; the only positive result attained was that the Chancellor delegated the decision for the time of commencement of the submarine warfare to Field Marshal Hindenburg.

Shortly thereafter, the leading authorities of the army and navy as a result of these discussions, concurred in the opinion that the war could only be ended favorably by means of a ruthless sub-

marine campaign, and that this should be initiated as soon as possible. However, the Chancellor still did not relax his opposition, although in a joint resolution of 7 October, 1916, the parliamentary majority, which Bethmann considered essential before authority could be given for the unrestricted submarine warfare to commence, was assured. The Chancellor complained bitterly over the "hurtful agitation" he claimed was being disseminated by the memorandum from the naval staff entitled "English Industry and the Submarine Warfare," and wished to forbid the publication of the strictly technical matter contained therein, in which, however, he did not succeed. This attitude on the part of the Chancellor is all the more remarkable, since at Pless he had expressed his fundamental accord with this policy. Evidently he still had hopes of American mediation (which had been abruptly refused in the last American note, as described) which was rather incomprehensible; or else he expected results from the peace proposals which were then being prepared on 12 December, 1916, at the instigation of Austria (Count Burian). At that time the question was much discussed as to whether or not this direct peace proposal, which was made by the Central Powers, and the offer of direct negotiations (26 December) had not wounded the vanity of President Wilson, whose good offices as a negotiator of the peace had been sought in September, 1916, and who had then ceased his efforts along these lines. As a matter of fact, nothing more had been heard from him meanwhile, and his attitude both directly before or after his reelection leaves grave doubts as to the sincerity of his efforts, which had brought him in conflict with the financial and industrial circles in his own country. We are now considering a period in which these circles were strongly interested in the victory of the Entente and the continuation of the war. (Compare this to the statements of Count Bernstorff in the parliamentary investigation of 21 October, 1919: Colonel House admitted to Bernstoff that the reason for the "knock-out note" of 10 May, 1916, was the fact that "the situation had become so involved that Wilson no longer had the power to force England to conform to the usages of international law." This was explained by the fact that American commerce was so much involved with the Entente that Wilson could not disturb these relations without arousing public sentiment to such a storm of protest that he would then be unable to impose his will on the Nation.) The President first put out these feelers for peace in 19 December, 1916, and on 17 January, 1917, received an answer from the Entente in which was demanded not only Alsace Lorraine, but the evacuation of the Danube Monarchy, the exclusion of Turkey from Europe, and the exclusion of the Central Powers from the negotiations. On

this basis, Wilson himself could not build further and his belated note brought no result. In a similar manner the peace offer of the Four Powers was abruptly declined. (30 December, 1916.) With these offers the Central Powers had only weakened their own position and greatly strengthened the will of the Entente to destroy them.

Meanwhile, the submarine war was partially revived by the fact that the Minister of War desired the traffic in munitions with Russia destroyed (Murman coast) and several submarines were dispatched to that zone (Submarine Orders 53 of 15 September, 1916) where they rendered valuable service in the destruction of munition-carrying steamers, etc. On the other hand, on account of diplomatic tension, Spanish steamers had to be spared everywhere, while for the rest the submarine warfare was conducted in accordance with the rules for prizes, and more and more boats were detached to the Mediterranean, which was the high point at the time of the submarine operations. Even around the coast of England armed merchantmen had to be spared if they did not start offensive operations, in order that the peace negotiations might not be disturbed; while only tank steamers (armed) were not spared, since these vessels could not possibly carry passengers. Since the war in accordance with the rules for prizes very seriously endangered the submarines, it was deemed essential to shift these activities to those zones where the enemy patrol was weak and the steamers were mostly unarmed. (Canary Islands, Madeira.) Further, after much discussion, it was conceded that the submarines might attack, without warning, darkened steamers in the channel, which were to the eastward of the line La Hague-St. Albans Head, since these vessels were employed exclusively in the troop transport service. Not until 9 January, 1917, after wearisome negotiations with the political leaders, was authority obtained to attack armed merchantships without warning. We are now approaching the period of the opening of the unrestricted submarine warfare.

Conferences between the military leaders, the naval staff and the commander in chief of the fleet, led to the conviction that every effort would have to be made to end the war by the fall of 1917, and that the defeat of England by means of the unrestricted submarine warfare was the best and only means available to accomplish this end. This idea was expressed in the memorandum of the naval staff of 22 December, 1916, in which the previously named number of 600,000 tons was given as the expected average monthly sinking. Against the number itself, nothing can be said, since this number was not only reached in many months but exceeded, but when the hope was expressed that with such sinking the will of

England could be broken in five months or better, as was determined in January, 1916, then one is less inclined to agree. The reasons for this viewpoint have already been given. To this was added the fact that the period of five months in which victory was to be assured was given out to the public and was regarded in the nature of a binding promise, which at first aroused great hopes and then led to disappointment and dispair. Finally, the announcement of this number of months acted in a detrimental manner on the building program of the Navy Department, where with the usual beaureaucratic shortsightedness, they feared to order new construction of submarines since they could not be completed within the expected time for the end of the war. In justice to Admiral Von Holtzendorff, it should be stated on the other hand that he did not find full support in his policy among the other government departments, who presupposed a rapid conclusion of the war as a result of this submarine warfare; and this war essential if not decisive,

After a conference with the Chancellor, which was presided over by the Kaiser on 9 January, 1917, the Chancellor spoke in favor of the unrestricted submarine warfare (see Ludendorff's War Memoirs). His "Notes on the War" do not record his own attitude on this important day. The result of this conference was the Kaiser's order "to commence the unrestricted submarine warfare with full strength on 1 February."

As soon as the first submarine stood out to sea in accordance with these new orders, Wilson, on his side, initiated his peace mediations and through Count Bernstorff asked to be informed as to our war aims. These very moderate demands were immediately presented to him (29 January, 1917) but no hope could be placed in the success of these mediations, since the Entente had several times announced their intention of dictating a peace of annihilation. That this conclusion was justified must be conceded in consideration of the attitude of Wilson, which aroused grave misgivings, although that did not prevent Count Bernstorff from characterizing him as pro-German. The submarine commerce warfare, in the only form in which it could have any possibility for success, began on 1 February, 1917. The fact that America might join the Entente was a possibility with which we reckoned, but it would be in error to state that America declared war on us as a result of the unrestricted submarine warfare. This was made clear by Wilson's speech to the Senate in August, 1919. This result was certain to come about as soon as demanded by the community of the Anglo-Saxon interests—i. e., as soon as it was apparent that Germany might possibly win the war. That this coalescence should reach a point of such grave importance is to be attributed to the results of the Wilson policy,

which dispensed with party distinctions, and after Wilson's diplomatic victories over the German Chancellor the majority of both Houses of Congress began to follow his policy. During January, 1917, the submarines had to proceed with the greatest caution. American and Dutch passenger steamers were permitted free passage under certain definite conditions. The various special treaties with the neutral powers whereby all kinds of exceptions were made, even in the case of submarine warfare in accordance with the rules for prizes, were again effective and sharply enforced.

Since previous experience had shown that the premature announcement of any war measures acted to considerably reduce their effectiveness, this new method submarine warfare was not imparted to the neutrals and America until 31 January, 1917, when they were informed by a memorandum. The note which accompanied the memorandum to America invited attention to the fact that our frequent peace proposals had been rendered useless by the hostile attitude of the enemy, which prevented any efforts for mediation, and that we were thereupon confronted by a new state of affairs. The German Government would be accountable to its own people if it did not employ every weapon at hand in the further prosecution of the war, and based its hopes on the fairmindedness of the American people and their Government.

The note did not announce any war zones, as previously, but stated that certain zones were restricted and that all commerce in those zones, even neutral, would be suppressed by every means. These restricted areas were exactly defined in latitude and longitude and included practically all the waters surrounding England, France, and the Mediterranean. Certain zones were made free for the passage of neutral traffic to neutral countries. These restricted zones were later extended and changed, as circumstances demanded. Neutral shipping was given until 5 February to leave enemy ports in which they might be; while American passenger traffic was safeguarded under certain definite conditions.

At the same time that this memorandum was dispatched, the Chancellor made a speech to the Reichstag, in which the grounds for this procedure were explained. (31 January, 1917.)

In the course of the month of February the various neutral powers (the northern powers jointly) protested against the German restricted areas, but without accomplishing tangible results. Later, these gave rise to certain concessions made to the neutrals, which undermined the fundamental principles on which the unrestricted warfare was based.

As one can appreciate from a perusal of Sims's book ("The Victory at Sea"), Jellicoe ("The Crisis of the Naval War"), and many other publications, the unrestricted submarine warfare brought to

England and the Entente the gravest danger and greatest crisis encountered during the war. It has already been explained why this form of warfare in the year 1917 could not have the same effectiveness and rapid results as in the spring of 1916. In addition to the other reason given should be mentioned here our diplomatic attitude at that time. Did not our diplomats humbly and abjectly apologize to America for the submarine warfare in much milder form? Were not soothing words and offers of reparations addressed to the other neutral powers on the occasion of a sinking of one of their vessels? Did they not make special treaties with these powers whereby all possible privileges were granted only in order to atone for the submarine warfare? Instead of standing squarely on their rights in the negotiations, they represented the submarine war as illegal and prohibited. Now this same Foreign Office comes and claims the right to inaugurate this unrestricted submarine warfare, not as a right even at this time, but as a form of warfare to which they have been forced to resort. It is really no wonder then that the foreign nations suffering under these conditions should characterize the unrestricted submarine warfare as a form of piracy; our diplomacy had already prepared the ground and paved the way for this conception. Above all, the attitude of our diplomats explains the reason why our procedure at this time was not regarded as really serious abroad, whereby the important intimidation, which should have been such an important factor in the beginning, was brought to naught. Although in the neutral countries there were strikes among the seagoing personnel protesting against cruises to England, these did not last.

Now, Tirpitz, for example, was of the opinion that in the first half of the year 1917 the Chancellor and the Foreign Office had finally resolved on the unrestricted submarine war in deadly earnest. If we study the negotiations of our diplomatic representatives abroad, however, which followed soon after the initiation of this form of warfare, we are inclined to doubt even this.

Thus, for example, our food agreement with Denmark, which assured England a certain supply of foodstuffs, at the instigation of the ambassador at Copenhagen was not published, so that the Danish food ships could not be captured by submarines even in accordance with the rules for prizes outside of the restricted areas. (There were certain agreements made with the neutral powers whereby we were to be assured of a certain percentage of their surplus of foodstuffs, etc.) The result of this failure was that a great amount of foodstuffs from Denmark was not diverted to Germany, but was transported in Danish ships directly to Aberdeen, etc., while these ships passed the narrow danger zone of the restricted area

during the hours of darkness. Even this new agreement with Denmark regarding foodstuffs was not favorable for the submarine activities (February, 1917), since the traffic in foodstuffs between Denmark and Bergen was exempted from seizure, and from Norway it was easy to transport this cargo to England. This concession to Denmark was still further extended in March, 1917. In the same month the submarines received orders to spare Spanish fruit steamers which were on certain routes. Since America had broken off diplomatic relations with us, her ships were to be regarded as neutral for the time being. This indulgence lasted, with few exceptions, until about November, 1917, whereby the extremely important exports from America resulted to the great detriment of the submarine warfare. Imports to America outside of the restricted areas were regarded as cargoes destined to neutral countries. The Norwegian cod and seal fishers in the Arctic Ocean were ordered exempted from seizure, although nine-tenths of their catch went to England, and this area was declared to be in the restricted zone (submarine order 114 of 1 June, 1917). On 13 June the Danish fish export to England was also exempted in a manner similar to the other agreements. The Dutch and Spanish fishing vessels were accorded free zones within the restricted area, although in the first case little and in the second case none of the catch reached Germany (20 June, 1917, and 10 August, 1917). Argentine ships also could not be sunk in accordance with the prize rules, and the heavy grain exports from this country were a considerable relief to the enemy (23 August, 1917). On 12 December, 1917, the free zone accorded to the Dutch fisheries was further extended. Swedish ships, which had been furnished certificates of safe conduct by the German consul had to be spared, and even when such safe conduct was lacking (28 May, 1918). Soon the Argentine ships were ordered spared in every case, and great caution had to be exercised in sinking Spanish ships, while in every case the safety of the crew of such vessels was to be assured (5 March, 1918). Cargoes for Switzerland were to be passed in every case, even on enemy ships which did not carry the notation "Switzerland" (18 April, 1918), a concession which was hailed by the enemy press as an important achievement for the Entente and which went much too far. With all these examples, the number of concessions made by the Foreign Office—which seemed so important to Wilhelmstrasse and which could not but rob the submarine warfare of the fruits of victory—was unfortunately not yet exhausted. To this list should be added the exemption accorded large English ships of considerable tonnage leaving the Swedish harbors. In the Mediterranean the throttling of the submarine activities was not so great as in the other theatres of war.

It will be clear to every reader that all of these concessions made by our diplomats were blows against the basic principles of this unrestricted submarine warfare, and the question arises, as to how such a state of affairs could be possible. Naturally, in every case, there were "diplomatic reasons," in which either the government was afraid to offend a German friendly country or wished to increase their prestige, or there would be industrial reasons given by which it was hoped that we might obtain increased imports from the country in question. Whether the first reasons could be considered sufficient for undermining our submarine campaign is very doubtful; the reasons given in the second case certainly can not hold, since the neutral powers had long since ceased to be masters of their own exports, as a result of the English industrial control, while regarding the Anglo-American measures of coersion, there can be no question. Naturally, the so to speak systematic injury to our submarine warfare on the part of the Foreign Office and our diplomatic representatives abroad did not occur without protest from the naval staff; but the latter were generally not informed and confronted by a "fait accomplie" or else overruled. In all these things one can see the moving spirit of Bethmann Hollweg, who, although agreeing to the unrestricted submarine warfare, still retained his fear of conflict and his policy of apology. Nothing can be accomplished with half measures.

The military authorities were, on the other hand, engaged in strengthening the net around England which had been slackened by our diplomacy.

From 27 February, 1917, on, after the neutrals had apparently reached an understanding with regard to the unrestricted submarine warfare, unarmed merchant ships were permitted to be sunk without warning in the restricted areas, which up to then had been prohibited. (Submarine Order No. 89.) On 28 March, 1917, at the wish of the supreme military command, the northern Arctic Ocean was also declared in the restricted area, in order that Russian war material might be effectively confiscated. All neutral vessels which were traveling under convoy were to be treated as enemy ships wherever encountered after 23 August, 1917. On 19 November, 1917, the restricted zone around England was extended farther to the westward in order to hinder as much as possible the unseen passage through the restricted area during the long winter nights; while, at the same time, a restricted zone was declared around the Azores, which was the base and transfer point of the enemy convoys. The neutral lanes leading to Greece were abolished after this country had become useful to the Entente as a result of the machinations of Venizelos. On 5 January, 1918, the vicinity of Dakar (West Africa) was declared a restricted zone, since this

harbor served in a manner similar to Halifax and Gibraltar for the formation of convoys and the arming of merchantmen. At the instigation of the naval staff, the German consuls were empowered to issue certificates of safe conduct to neutral vessels, a procedure which was supposed to hinder the export of contraband to Great Britain, but which never attained the results achieved by the British and American measures of coercion.

In regard to the declaration of restricted areas near the coast of North America, which was desired by many after the construction of the submarine cruisers, this course was rightly abandoned. In that event, we would have only raised pretentions, which with the small number of submarines available, we could not have carried through. On the whole, we shall have to characterize the submarine cruiser warfare carried out with great vanity on the coast of Africa, and in spite of the apparent encouragement of Rose's success near Nantucket, as a grave mistake. The trip back and forth, together with the long repair periods necessary, did not make the venture pay, since the average monthly sinking could not reach that attained by the smaller boats, while the costs of construction and the number of personnel carried in the crew was considerably greater.

For the historian of the tragic submarine warfare, it is a relief to note that the initiation of the unrestricted submarine warfare brought with it of necessity a freedom from the exchange of notes with America, which after April, 1917, had joined the enemy. Unfortunately, this ineffective chapter, which meant nothing but defeat for our diplomacy, began again toward the close of the World War, when the socialists, who had seized the power, sought to obtain from Wilson a peace which would be bearable. The "negotiations" interest us only in so far as they influenced the submarine warfare: and it may only be noted in brief that the machinations of Wilson in this connection represent one of the greatest swindles of the modern world: a real American "humbug" in which truly the American people did not participate. Whether or not history will hold the people to account for the actions of its self-elected President is another question.

On 9 January, 1918, Wilson sent a message to Congress in connection with the peace treaty of Brest-Litovsk, which contained the well-known 14 points, a political world program, containing among other things the one painful point for us—i. e., the separation of Alsace-Lorraine (point 8). In this program, which was in no wise binding on the Entente, was contained a postscript, in which Wilson declared against any intention or desire to alter the German domestic organization, but wished to establish a basis of justice for all nations and peoples. This program resulted in destroying

the warlike spirit of the German people, a result which was purposely intended. The peace resolution of the German Parliament in the summer of 1917, together with many other events, must have led the President to believe that many of the German people would take the bait. He did not deceive himself in this. In general the German people believed that this would form a basis of the peace which would be made with the Entente, while this led to the conception that the Government could have peace if they really desired it and that this peace which would result would be acceptable to Germany. Thus this program became the fulcrum for lifting any further resistance and for the abandonment of the submarine warfare. On 5 October, 1918, the Government of Prince Max of Baden, who had succeeded Hertling as Chancellor on 3 October, requested President Wilson to act as mediator for a peace on the basis of his 14 points and to bring about an armistice. Thereupon there followed on the part of Wilson one diplomatic blow after the other. The armistice was refused as long as German armies occupied enemy territory; on 12 October, 1918, the German Government agreed to the evacuation of the occupied territory. Thereupon, Wilson declared that the formulation of the armistice terms was a matter for the military authorities of the Entente, and that the military superiority of the Allies should be maintained, while the submarine warfare constituted the principal obstacle to any peace negotiations. Even these conditions were accepted by the Government, and President Wilson was informed on 21 October, 1918, that the submarines would sink no more passenger ships, while at the same time it was agreed that the parliamentary form of government demanded by Wilson should be inaugurated. Whereupon Wilson went a step further and demanded an armistice in such a form that the Allies and America might go to any lengths to enforce their conditions while all belligerent activities were denied the Germans; while the abolition of the monarchy was made a prior condition to the initiation of peace negotiations (23 October). This meant a complete capitulation, which was accepted in spite of the protests of the military, and the Government asked Persident Wilson to name the conditions (25 October). We are interested here in the treatment the submarine warfare received as a result of these negotiations.

The military and naval authorities were agreed that this was the weapon most feared by the enemy. Even though the collapse of Austria and the evacuation of Flanders meant the abandonment of the submarine bases in the Mediterranean and on the coast of Belgium, it was realized that most of these boats would still reach their home bases, and that the submarine warfare could be conducted around England with even greater forces. Further, a conference

between the naval authorities and the industrial representatives at Cologne on 1 October had shown that the industry was in a position to carry out the extensive building program for submarines (Scheer program) and thereby considerably increase the number of available submarines. The military leaders, therefore, demanded that the submarine warfare not be sacrificed and that it should only be halted during the period of the armistice and in consideration for favorable terms. In the meeting of the war cabinet on 17 October this line of action was decided on as necessary and correct as opposed to the Foreign Office, but on 19 October, after the Foreign Office had been strengthened by three of the foreign ambassadors, this proposal of the military authorities was dropped (telegraphic protests from the high military command and the personal intercession of the Kaiser accomplished nothing) the above-mentioned note of 21 October was dispatched to Washington. The fact that the promise not to torpedo any passenger vessels meant the suspension of the submarine warfare was clear to the Foreign Office and will be understandable to the reader. Then, how could it be possible for a submarine to determine whether a ship was a passenger vessel or not and thus avoid accidents and complications, due to mistaken sinking, when about 90 per cent of them were now armed? With the note of 21 October the submarine warfare was sacrificed without obtaining favorable conditions for ourselves, and thus our strongest weapon was surrendered. The recall orders to all submarines were issued by the naval authorities on 21 October, 1918. Thus the submarine warfare was ended even though some of the boats proudly continued their warlike activities on the return trip where opportunity offered.

In connection with the subject of this book, it is interesting to note the effect on the sentiments of the army and navy of this continual yielding of the Government up to the complete capitulation, even before the armistice had been granted. It was now an easy matter for the revolutionary leaders to convince the men that the Government wanted peace at any price, while the officers (drawing a class distinction) did not. This slogan played a decisive part in the revolution in the navy, after their other efforts and propaganda had been shattered on the discipline of the crew. Then it was easy to win them over for a military strike—the revolution in the navy can not be otherwise characterized at first—by convincing them that it was the will of the Government; they could not realize that their leaders had to fight on, since the armistice had not yet been made effective and the continuation of the war was the best possible means of obtaining an amelioration of the conditions to be imposed.

Regarding the activities of the demagogues more later. The purpose of this chapter shall only be to expose the evil effects of our diplomacy on the course of the submarine warfare.

Chapter III

THE MILITARY ACCOMPLISHMENTS OF THE SUBMARINE WARFARE

The manner in which the carrying out of the submarine warfare was hindered and influenced by politics was shown in the preceding chapter. Many of the submarine orders issued were directly opposed to the military interests. In the following chapter, the course of events will be described from a strictly military and seaman's standpoint.

As stated in the first chapter, in the beginning of the war no one had a very clear idea as to the possibilities and method of conducting submarine commerce warfare. While there were advocates of this theory, no one had carefully worked out the application. As already stated, the technical development of the submarine in the last years preceding the war had gone ahead so rapidly and so extensively that there was insufficient experience available to judge whether or not submarines could be usefully employed in the extensive operations required by such commerce warfare. At first, all thoughts were directed toward engaging the enemy Battle Fleet with all possible forces; and of the submarines it was expected that they would prove to be an important auxiliary of the fleet in our action with the Grand Fleet as a result of the gained experience at maneuvers. In general, the realization of the possibilities which lay beyond a strictly military employment of this weapon was dormant, while the new construction of submarines which was to follow as a result of the mobilization order, according to plan, was not authorized, and the naval authorities decided to abolish the submarine inspection and submarine training school (August and September, 1914). It was considered that for technical reasons the speeding up of construction of the submarines was impossible, although we were then 15 boats in arrears of the building program.

But this picture was soon to change. While the fleet was being held back for political reasons, the commander of the submarine forces, Commander Bauer, succeeded in obtaining authority to abandon the fruitless employment of these boats on patrol near the German Bight, and made them available for offensive operations shortly after the outbreak of the war. These operations began on 6 August, 1914, with a cruise limited to seven days for scouting in the northern and central portions of the North Sea, and accomplished their first

success in the sinking of the *Pathfinder* on 5 September (*U-21*, Hersing); reaching its height with the sinking of the *Hogue*, *Aboukir*, and *Cressy* on 22 September, 1914 (*U-9*, Weddigen). These and other successes of the submarines, which were not—as erroneously stated in English books—accomplished by means of traps (disguised Dutch fishing vessels) but in honorable battle, soon had the undesired effect of awakening the English to the danger of submarine warfare. But we were first shown the dormant possibilities of this weapon by the submarine commanders who observed the stream of English shipping while on these military operations, and began to agitate for attacks on this commerce. From this there resulted an increasing number of proposals to the commander in chief, which finally culminated on 19 October, 1914, in the request for authority to commence commerce raids as reprisals for the blocking of the English Channel with mines. The English declaration of the North Sea as a war zone (5 November, 1914) induced the chief of the naval staff to seriously consider these proposals. From now on, aside from the doubts expressed by the Foreign Office, it was simply a matter of the proper time and methods to be employed in this submarine war. The leading naval authorities could not ignore the necessity for this submarine warfare on enemy commerce, in view of the English measures and the statements made by the leading authorities of that country. As early as the beginning of September, the Dutch negotiators in London were unblushingly informed that Germany would and must be starved out, and that Holland would be permitted to receive only such food supplies as she herself needed for home consumption. The other neutral powers had received the same ultimatum, neutral ships and neutral cargoes had already been confiscated by England, and under this pressure our neighboring countries had begun to prohibit exportations. If a means existed to break down this illegal blockade, it had to be chosen, since it was clear that the neutral powers were yielding to this coercion after ineffective paper protests.

But in spite of all these reasons, whether or not the time set was proper and not premature, has already been discussed in the second chapter. In this connection, it will only be stated here that the decision taken to cut loose in February, 1915, must be designated as very bold, with respect to the capabilities of the individual boats. In spite of a few practice cruises in peace time and the war experience up to that time, no one could as yet judge whether or not the actual radius of action and the navigational possibilities would suffice to meet the demands imposed by such submarine commerce warfare, and whether the boats were sufficiently trained to meet these conditions. The first cruises were limited to seven days,

while the first 10-day cruise was made by the *U–20* in the middle of October, 1914. In this respect, however, one must not be disappointed in the performance of the submarines. War is the best teacher, and by inciting the men to greater patriotism and pride, their performances increased considerably beyond the peace-time requirements. Later on, it was not unusual for our submarines to remain at sea for periods of 30 days (Ms type); the record for this type being held by the *U–53* (Rose) with 41 days, the submarine cruiser, type *U–151* (Kophamel) with 113 days, while of the UC and UB boat types, the record was 55 days, held by the *UC–20* (Becker). A large number of technical improvements were necessary before the submarines were capable of such performances, while in this respect the submarines at the outbreak of the war were far below the level attained later on.

The period preceding the actual submarine warfare (from the outbreak of war to February, 1915) was characterized by a number of submarine military operations, which were not conducted in close tactical cooperation with the fleet, but led to a number of beautiful successes (cruisers *Pathfinder*, *Hogue*, *Cressy*, *Aboukir*, *Hawke*, *Hermes*, *Pallada* (Baltic), the battleship *Formidable*, the gunboat *Niger* and the submarine *E–3*. These deeds of our submarines not only brought about considerable encouragement to the population, but even worked to hinder the supply of troops and material from England to France, and deranged the strategic plans of the enemy (for example, the sinking of the *Formidable* in the Dardanelles campaign). These operations furnished us with valuable information regarding the capabilities of these boats and led to important technical improvements. This, however, was the limit of their achievement, since they could not be a decisive factor on the course of the war. On the other hand, they were useful in concealing the necessity for the employment of the High Seas Fleet itself, and at the same time gave the enemy an undesired lesson in this respect. Their principal importance lay in the information gathered and the training of the personnel, which finally led to the idea of originating the commerce warfare. Otherwise, the reconnaissance cruises of the submarines were not particularly fortunate, for example, the cruise of the *U–18* (Hennig) to Scapa failed to disclose the presence of the Grand Fleet, and the *U–12* to the Downs (sinking of the *Niger*) simply brought out the fact that the Downs was one of the principal points of rendezvous for the English commerce.

The operations of the individual submarines against Dunkirk under orders from the fleet to relieve the right flank of the army which was subjected to enemy fire from the sea (18 October to 2

November, 1914), was also fruitless; this mission, rightly conceived in regard to its importance, would have justified the employment of the entire High Seas Fleet. The fact that the submarines accomplished nothing while on this mission is to be attributed to the small force employed, and in a broader sense to the total lack of cooperation between the army and the navy. In this connection it might be further remarked that the mission of the submarines in the English Channel was hopeless from the start (sinking of troop transports), since they were only permitted to sink these vessels after they had fully established the fact that such were actually troop transports, which was impossible at night, while even in the daytime the troops were kept below decks. In spite of that, these faults in our war organization must be again emphasized, where they appear for the first time with tragic consequence. For, after all, the submarines were not our only naval weapon, and, in my opinion, this fault in our organization let to the fact that our advance was halted at Nieuport, and the submarines lost the important bases on the French coast of the channel, an event of inestimable influence on the final outcome of the war. As a result of this same fault of organization—to which is to be attributed the fact that nothing was done to prevent the transfer of the British Expeditionary Corps across the channel—mistakes were often made, contrary to the English procedure, where the will of Lord Fisher was sufficient to better prepare for eventualities. Further, our submarine base in Adria was also to suffer from this fault (lack of cooperation) although to a lesser extent, since for this same reason the occupation of Valona was neglected and toward the close of the war the enemy was thereby able to practically close the Straits of Otranto.

The submarine commerce warfare began by itself, so to speak, in the period before the submarine warfare was declared, in that the *U–17* on 20 October, 1914, sank the British steamer *Glytra*, in accordance with the rules for prizes; and the *U–21* followed in November with the steamers *Primo* and *Malachite* in the English Channel. In January, 1915, about 16,000 tons of shipping were sunk, and in February (before 18 February) about 23,000 tons.

In this same period the first submarines were dispatched to Flanders (Zeebrugge)—namely, *U–5*, *U–11*, *U–12*, and *U–24*. The last-named boat (Schneider) sank the British battleship *Formidable*, while operating from that base (31 December, at night). The establishment of the submarine flotilla there occurred later (29 March, 1915) while the first boat to enter the locks at Zeebrugge was the *U–12* (Forstmann) on 10 November, 1914.

At this place the importance of the bases in Flanders should be noted, with respect to the submarine warfare. These lay, so to

speak, at England's front door (65 miles from Dover) and resulted in a considerable saving in time and energy for all operations in the channel, the coast of France, and the south and west coasts of England. The saving in mileage, as compared with the distances from Wilhelmshaven, meant about 300 miles in going and returning from these operations areas—i. e., an average saving of two and one-half days on all distant operations—which meant a considerable increase in the effectiveness of the weapon. On the other hand, these bases lay so close to the enemy front and the English coast, that they were exposed to severe damage, provided they could not maintain superior forces for protection both ashore and afloat. It was out of the question to obtain a measurable superiority afloat, since the water was so shallow at both harbors that not even a light cruiser could be accommodated. The principal defect of this base was the fact that while it lay on the shore of the English Channel, it was at some distance from the narrows, both banks of which remained in enemy hands throughout the war. The enemy was always in a position to block both entrances to the channel, which they finally did, and thus make the advantages of the Flanders base an illusion. That this was not accomplished until late in the war is strange, since contrary to the assumptions of Admiral Bacon, the superiority at sea remained constantly with England, even though one considers the English Dover Division their sole enemy.

On the occasion of the English raid on the Helgoland Bight (27 August, 1914) the German submarines which were on hand did not participate in the action, although, according to Hurd, the English armored cruisers thought they were attacked by submarines four times and the cruiser *Lowestoft* once (submarine panic).

The submarine losses in this period preceding the opening of the submarine commerce warfare were naturally small, since at the time there were no effective submarine defensive measures developed. Where such losses occurred, they represented the toll taken by the new and inexperienced weapon which was as yet untrained for the difficult problems encountered in war, and usually can be attributed to faults of matériel or errors in navigation. These will not be recounted in detail in this or any of the other chapters, as this would break the continuity of the history. These will be found tabulated in the back of the book.

1. RESTRICTED SUBMARINE WARFARE, FROM 22 FEBRUARY, 1915, TO 24 APRIL, 1916

The restricted submarine warfare (with exemption of American and Italian ships) began in the North Sea and the channel on 19 February, and in all other areas on 22 February, 1915.

The number of submarines available at the front had meanwhile been somewhat increased to 30, in spite of a few losses, of which 7 were assigned to the Baltic, leaving 23 boats for operations against England. In order to appreciate the meaning of this number, it must be remembered that in general each extended cruise was followed by an equally long overhaul period, during which improvements were also made, while the time required for the trip to and from the operations area must also be deducted from the period of active service. Thus, on the average, there could be only about two-fifths of the total number of boats in the immediate vicinity of the enemy; in this case, about nine boats.

The two submarine flotillas which were in commission at the outbreak of the war had now grown to four, which were disposed as follows:

I. Submarine flotilla (Pasquay), Brunsbuttelkoog.

II. Submarine flotilla (von Rosenberg-Gruszczynski), Wilhelmshaven.

III. Submarine flotilla (Gayer), Emden.

IV. Submarine flotilla (Prause), Emden.

This does not include the Baltic flotilla at Kurland, since that group was not under the command of the commander in chief of the fleet, and the commander submarine forces (Commander Bauer), but was under the orders of the commander in chief of the Baltic forces, Prince Heinrich. This territorial division of the coast into two parts was not advantageous (High Seas Fleet and Baltic forces), since the activities of the fleet in the Baltic were more or less hampered and at times important forces were withdrawn in spite of the protests of the commander of the Baltic forces. The English organization whereby the forces were divided into fleet and coast defense is much preferable.

The data relative to the organization and disposition of the submarine flotillas runs somewhat ahead of the time under consideration (February, 1915), but in order to give a more comprehensive view of the situation, the final organization of our submarine forces is given here. To the above were added:

1. The V submarine flotilla (Jurst, Bremerhaven), High Seas Fleet.

2. The submarine flotilla, Flanders (Bartenbach, Brugge), naval corps, which was later expanded to form two flotillas under the command of the commander submarine forces, Flanders (Bartenbach). This flotilla was organized on 29 March, 1915.

3. The submarine flotilla Mediterranean (Pola, Commander Kophamel, from November, 1915), which was later expanded to two flotillas (Pola and Cattaro), under the command of the commander

submarine forces in Mediterranean (Pullen). There the I flotilla was commanded by Lieut. Commander Otto Schultze, later by Lieut. Commander Friedrich Lutzow; the II flotilla by Lieut. Commander R. Ackermann. This organization was under the military control of the Austrian fleet command, but otherwise under the authorities at home. From these, a detachment was temporarily dispatched to Constantinople. The first submarines from this group started operations from Pola on New Year's Day, 1915.

4. The submarine cruiser flotilla in Kiel was at first under the naval staff, later under the command of the commander submarine forces of the fleet (Commodore Michelsen). This officer succeeded Commodore Bauer in this command. The chief of staff was Commander Paul Reymann, one of the most brilliant officers of the submarine service.

These different bases mentioned, both at home and abroad, required the most thorough fitting out if they were to meet the demands for repairs, fitting out, and training. This was a relatively simple procedure in the home bases, since they could be established at points where the dockyards were available and good living quarters could be easily furnished by refitting some of the older warships for the purpose. The matter was quite different abroad. Although there was no lack of living quarters, particularly in Brugge and Libau, the repair shops had to be built at each base. This occurred with sufficient rapidity only in Flanders (Brugge and Ostende), since the naval corps was under the energetic command of Admiral von Schroeder and the support of the Navy Department was assured from the beginning (Admiral Tirpitz was the creator of the naval corps in Flanders). On the other hand, very little was done in Pola and particularly in Cattaro, a piece of neglect which was to cost us dearly later on when the submarines there were in urgent need of thorough overhaul, and the important operations in this especially favorable zone (the Mediterranean) were badly handicapped. The assistance of the submarine bureau and the appointment of an energetic personality (Admiral Horthy) to command of the Austrian forces came too late to make up for the previous neglect.

That the restricted submarine warfare, with its variable treatment of the different neutrals, should be under an unfavorable star from the start is apparent from the preceding chapter. The submarines were to sink the neutral vessels (especially American and Italian) only in accordance with the rules for prizes—i. e., after boarding and search had established the presence of contraband. Naturally, this was impossible at night, and during the day it was rendered more difficult by the misuse of neutral flags on the part

of enemy merchantmen, under orders from the British Admiralty (secret order of 13 January, 1915, renewed on 15 May, 1915); the fact that some of them were armed (exchange of notes between America and England) and that they soon received orders to take the offensive against submarines. The advantage possessed by the submarine over larger vessels, its invisibility, is offset by its vulnerability, so that enemy gunfire may quickly rob it of its diving ability, and its slow speed, which even to-day make its impossible for a submarine to overhaul fast ships, once they are beyond the effective range of the submarine armament. In those days this range was the limit of their torpedo fire, since the submarines then were only armed with 8.8 cm. guns or not at all, and the development of submarine armament was still in its infancy. Therefore, such boats were forced to attack with torpedoes from a position ahead. If they could not do this, then every fast vessel and every armed ship would escape them. Considering these circumstances, it is easy to understand why it was impossible for the few submarines which we had available at that time to exert much influence on the enemy shipping, unless they were relieved from the impossible requirements of coming to the surface and searching the vessels.

With regard to new construction, the situation in February, 1915, was more favorable than at the outbreak of the war. Under construction were 17 small submarine torpedo boats (*UB 1–17*) and 15 small mine layers (*UC 1–15*), for which contracts were let in November, 1915, when it was realized that the bases in Flanders should be made effective as soon as possible. Since the motors for these boats were already completed, they were delivered very promptly (May to July, 1915) and were shipped broken down by rail to Brugge and Pola, while a few were sent overseas to Brugge. (The further details of these deliveries are given in a table in the appendix.) Further, the submarine torpedo boats *U–38* to *U–45* (with exception of *U–42*, which was ordered abroad and not delivered) contracted for before the war were completed and fitted out. Under construction were the series *U–46* to *U–62* (ordered after the outbreak of war) and those boats ordered in January, *U–63* to *U–65*, as well as the large mine layers *U–71* to *U–80*. Five Austrian submarines (*U–66* to *U–70*), which had been ordered from the Germania works in Kiel, were taken over and delivered in the fall of 1915. These reserves were not very large when one considers that it was necessary to allow about a yard and a half for the construction of one of the larger submarines. One can easily explain this small number of contracts for submarines on the grounds that the shipyards were already overcrowded with construction and that many believed that the new construction would still be incomplete when the war ended; still it

was a short-sighted policy. We should have let contracts for a large number of the approved types of the larger submarines, and, since the larger shipbuilding companies were working to capacity, other dockyards could have been employed for this work. Although the Navy Department was then chiefly concerned with the new battleship construction, some consideration should have been given the submarine-building program and its relation to the industry as a whole.

The reader may be inclined to conclude from the previously stated small number of submarines that the failure of our submarine offensive might be attributed to this cause and that for that reason it was doomed; but, on the other hand, in our favor was the fact that aside from the ramming of the destroyers and the practically worthless indicator nets, the enemy possessed at the time practically no means of submarine defense, since the English mine failed so far as submarines were concerned (the submarine defensive measures will be treated specially).

In fact, as Admiral Tirpitz expressed it, the submarines could cut out merchant ships like a wolf in a sheepfold; and it was not the small number of submarines but the restrictions which were loaded on the submarines from the start by the political leaders and constantly increased until, instead of achieving great success, the submarine warfare in this period finally came to a grievous end. For reasons explained in the previous chapter this period may be divided into three parts—namely, 1, up to 5 June, 1915; 2, up to 30 August, 1915; 3, up to 24 April, 1916. The dates correspond to the restrictive orders issued to the submarines instigated by the chancellor as a result of the *Lusitania*, *Arabic*, and *Sussex* incidents, the last of which (submarine warfare in accordance with rules for prizes) brought about the complete suspension of the submarine campaign.

These restrictive orders, far greater in number than those here mentioned, had to be equalized by the increased training of the personnel and the boldness of the crew, since in the vicinity of the English coast, at any rate, the number of submarines was not increased except by the Flanders flotilla. (The number of boats attached to the High Seas Fleet did not exceed 25 at any time during this period.) The results increased with slight variations from about 23,000 tons in February, 1915, to about 189,000 tons in April, 1916. The exact monthly record of sinkings is given in the appendix.

The figures are reliable so far as the first and second periods are concerned, since as a rule the lack of counteroffensive measures on the part of the enemy permitted an exact determination of the tonnage of the vessel sunk. Later on the figures as made public by the

press are somewhat less exact. In making these estimates a certain amount of practice was necessary, for example, about 10 per cent was deducted from the estimated tonnage, although these estimates were made by experienced observers (captains and pilots of the merchant marine who accompanied these boats as war pilots on their cruises). No great error will be made if the figures as given are accepted, since they were computed with great care. For the different periods the numbers were checked as far as possible and, in those casese where the numbers were allowed to be published at all, by the reports from abroad. Thus they scarcely differ at all from the figures given by Lord Beresford up to New Year's, 1918. A good check on the accuracy of the record of tonnage sunk is shown by the fact that the number of submarine commanders who habitually underestimated the tonnage about equaled the number who were unconsciously swayed by optimism and overestimated. Toward the very end of the war the enemy counteroffensive became very effective, and it was only seldom that an exact determination of the tonnage sunk could be made, while the enemy either suppressed all reports of sinking or gave out erroneous figures, thus making it difficult to give the true figures. While this effort was constantly being made it happened at times, for example, that where the submarine offensive was being conducted close inshore instead of far out a ship which was thought to be sinking might later on be salvaged and towed into port. It is also to be feared that the sinkings due to the mine-laying submarines, which in the absence of all information are lumped together in the calculations, are somewhat exaggerated, as the mine is considerably inferior as a weapon to the torpedo, due to the characteristics of the weapon, so that the difference between a mine and torpedo hit may be clearly discerned with the naked eye when the damaged ship is in dock.

All skeptics—i. e., sentimental and intellectual "defeatists"—should be referred to the book of that candid American, Admiral Sims (Victory at Sea) who in a tragi-comical vein, writes of the means to which the British Admiralty had to resort to deceive the English people in regard to the loss of ships. (Spring of 1917.)

(See Sims, pp. 6 and 7. Jellicoe admitted to Sims that the British Admiralty did not dare publish more than one-third or one-fourth of the total losses to shipping, that in reality in March 603,000 tons had been reached, and that in April 900,000 tons was to be expected, that the reports in the English press regarding the large submarine losses and the voluntary surrender of the German submarines were lies, that no effective weapon against the submarine was available, and that one would have to count on the downfall of England in November, 1917. The American admiral was fairly astounded.)

Several other events occurred in the first part of this period which must be recorded.

In April, 1915, the submarine flotilla in Flanders appeared on the scene. This flotilla, later expanded to two, had accomplished extraordinary results under the leadership of Commander Bartenbach. This flotilla never failed in its mission, even under the increasingly difficult conditions under which it was forced to operate, in particular, the barricading of the Straits of Dover between Folkestone and Grisnez, and the small number of submarines available, while the results obtained were exceptional considering the number of boats employed. This is without doubt to be attributed to the excellent spirit displayed by the corps. The English acknowledged this, but sought later to belittle this spirit, as a result of the detractions of Belgium scandal mongers.

One very important event during this period was the dispatch of the *U–21* (Hersing) to the Dardanelles, where the situation at the Turkish front had become critical as a result of the chronic lack of munitions and the operations of the allied naval forces. Although the fuel oil taken on en route (he proceeded around the Orkneys) proved unserviceable, the commanding officer decided to continue the trip and arrived in Cattaro on 13 May with one-half a ton of fuel on board. He arrived at Constantinople on 5 June, after sinking the battleships *Triumph* and *Majestic* in the Dardanelles. Since the lack of munitions was still critical, and an energetic enemy would still have been able to force the Dardanelles, the submarine commander was rightly greeted as the saviour of Constantinople. With respect to the submarine losses during this period, special mention is deserved by the *U–29* (Weddigen). According to Jellicoe (the Grand Fleet) this boat was lost while making an attack on the English battleship squadron I (18 March, 1915, between Peterhead and Norway) probably after Weddigen had turned to attack battle squadron IV, which was in the vicinity after his attack on the battleship squadron I had failed. The *U–29* was rammed by the *Dreadnought* and sunk. In the loss of Weddigen, the navy mourned one of the most successful and brilliant officers in the submarine service, who had further rendered great service in the development of the submarine tactics.

In April, 1915, occurred among other things, the well-known "Fryatt incident," so called from the name of the captain of the English steamer *Bruxelles*, which undertook offensive operations against one of our submarines (*U–53*) in accordance with instructions from the British Admiralty. He reported the submarine as sunk, which was actually not the case, received the prescribed reward, was later taken prisoner, tried before a military court in Flanders, found guilty, and shot. Even though the arming of merchantmen

for defensive purposes might have been a generally recognized measure (which it was not), we could not condone such offensive operations against our warships.

The sinking of the *Luisitania* by the *U–20* on 7 May has already been described in the second chapter: unfortunately, this military success led to a further restriction of the submarine warfare as a result of the diplomatic consequences and led up to the second part of the period of restricted submarine warfare.

In this period, aside from several very successful cruises, was the one of the *U–38* (Valentiner) with 70,000 tons to his credit (22 freighters, 5 fishing vessels, and 3 sailing vessels), which deserves special mention. There also occurred the famous "Baralong incident" on 19 August, 1915, which has already been mentioned: here it will suffice to record for all time the name of the English officer who murdered the crew of submarine *U–27* (Wegener) in cold blood, and so maltreated the single surviving officer that the latter was crippled for the rest of his life. The name of the honorable officer was McBride. He certainly earned the blood-money, but one may doubt if he earned any commendation from Lord Fisher (who wanted to boil the prisoners in oil, etc.[1]) since this "Malay" and "man ran amuck" (British designations of this celebrated man) stood only for ruthless destruction where it was necessary to the best interests of his own country; and was never a proponent of cold-blooded cowardly murder. Thus, this shameful deed remains a blot on the fair name of the British Navy.

The third division of this war period dates from the sinking of the *Arabic*, and is characterized by the fact that after this time no passenger vessels, either large or small, were permitted to be sunk. This meant a further difficulty, which led in fact to the final decline of the submarine warfare, since, though it was possible for the submarine commanders to recognize and avoid the large well-known passenger steamers, how was it possible for them to distinguish between a small passenger steamer and a freighter? This could only result in the passing of many a ship which could rightly have been torpedoed, or an "accident," and sometimes both. This was the effect of the order in the northern theater of war, while only in the Mediterranean, where there were few passenger steamers and traveling Americans could the submarine campaign be continued without excessive weakening. Four of the larger submarines were, therefore, detached from the High Seas Fleet to that station.

[1] Expressions used at The Hague in 1899 when he wished to oppose any laxity in connection with the negotiations regarding "Dealing with the enemy." In his memoirs, Lord Fisher stated that possibly he had expressed himself somewhat too forcibly, but one was a fool if he did not cause the enemy population to be hated in time of war. In this he may have been right.

The order of 20 September, 1915, to cease submarine commerce warfare to the westward of England and in the channel was issued under pressure from America and was only logical in view of the difficulties of the submarines and the demands of the Chancellor that all further "accidents" should be avoided; but this meant the abrogation of the submarine warfare in the waters surrounding Great Britain. Thus, in this all-important war zone, there remained nothing but the activities of the mine-laying submarines. In this emergency, the torpedo submarines were partially equipped with mines which could be fired out of the torpedo tubes, but this was an unsatisfactory half measure which could not begin to replace the lost effectiveness of these boats, owing to the uncertainty and poor effect of the mines.

The summer of 1915 was distinguished by the first appearance—at least at the time—of a really effective antisubmarine measure, the submarine traps. These will be discussed in detail under the heading of antisubmarine measures. It is clear, however, that in the majority of cases these measures could not be effective if the submarines were not compelled to come to the surface and investigate the ship. Had we not allowed ourselves to be led astray by America we probably would not have lost all of the 12 submarines which fell victims to this particular measure (most of these losses occurring in the year of 1915).

The sinkings in September as a result of this order to cease activities in certain areas fell to about 130,000 tons (against 175,000 tons in August).

The third period of the first submarine campaign, a period of stagnation—at least around England—gives us an opportunity to answer the question as to whether or not the unrestricted submarine warfare in 1915 might have been successful. This may be answered in the affirmative, although it should not be forgotten that the initiation of this warfare in February, 1915, was somewhat premature, as already explained. On the other hand, it may be stated definitely that the unrestricted submarine warfare begun in the summer of 1915 would certainly have led to success, whereby it is assumed that with such a decision the political and diplomatic hindrances would have been wiped out. With such a warfare beginning in the summer of 1915, we should then have had 44 submarines available, which would have sufficed for operations around England. This number includes those boats lost during the war up to that time as a result of insufficient training, etc. When we consider that even with the hindrance of the restrictions imposed by the diplomats an extended submarine cruise yielding from 20,000 to 30,000 tons in sinkings was not exceptional, then we may cer-

tainly be justified in assuming an average of 30,000 tons per cruise in 1915 without these restrictions. Since the submarines could undertake one such cruise every two months, this gives a result of 15,000 tons per month per boat, or for nearly 50 boats a monthly record of sinkings of about 750,000 tons. England could not possibly have been able to sustain this damage without collapse, since at that time she had neither adequate submarine defensive measures nor could she replace the ships sunk so rapidly, while no help could have been counted on from America. While it is true that in making this estimate the effectiveness of the small boats has been assumed to be equal to the larger boats, still the basic assumptions were made so low in regard to the other factors that the final result may still be regarded as correct. Even this number of 750,000 tons per month would not have been essential at that time to force England to sue for peace.

The submarine success corresponded to the condition of stagnation in the warfare in the vicinity of Great Britain, where practically only mine warfare could be conducted. Even though shortly after, the Flanders flotillas were permitted to sink ships flying enemy flags (without warning) in the zone between Dunkirk and Le Havre, this concession did not exert a measurable influence on the result, owing to the small area involved and the misuse of neutral flags. While the monthly sinkings did not immediately fall off in this period of the submarine commerce warfare, this was almost entirely due to the operations in the Mediterranean, where the enemy patrols were not thoroughly organized and the warfare could still be conducted in accordance with the rules for prizes, with little chance for errors of far-reaching effect. From December on, however, a few trial cruises were made with the submarines in the northern theater of war, in order that the enemy might not be given opportunity to concentrate his counter offensive measures on the Mediterranean. On 24 February, 1916, the submarine commerce warfare was again reopened, but only in restricted form against troop transports and armed merchantmen; while in March—inside of the war zone—the submarines again started operations against all enemy merchant shipping. In the vicinity of England, these operations resulted in sinkings of between 20–30,000 tons monthly by the *U–20* (Schweiger, an excellent commander), *U–44* (Wagenfuhr), *U–66* (von Bothmer), *U–69*, (Wilhelms), *U–70* (Wunsche), *U–18* (Steinbrinck), and *UB–29* (Pustkuchen); heroes all of whom only Steinbrinck and Bothmer are still alive. But this submarine warfare in northern waters only flared up again for a short time, as the *Sussex* incident (24 March, 1916; *UB–29*) resulted in the military authorities being

forced to revert to submarine warfare in accordance with the rules for prizes, under pressure from the political leaders (24 April, 1916).

2. SUBMARINE WARFARE IN ACCORDANCE WITH PRIZE RULES

That blow struck the submarine service so much harder as the successes had just then begun again to increase (compare the months of March and April, 1916). This was due to the increasing mine operations from Flanders, and the renewal of the torpedoing of ships in the waters around England, while the operations in the Mediterranean continued undisturbed. A further reduction in the sinkings must now set in, as a result of the order of 24 April, 1916. That this reduction occurred in spite of the excellent condition of the boats and the increase in numbers is due to the fact that both the High Seas Fleet submarines and the naval corps in Flanders entirely suspended operations. A compromise proposal made by the commander submarine forces of the fleet (Commander Bauer) as a result of his personal observations on a cruise around Ireland was rejected by the naval staff, although supported by the commander in chief of the fleet. Under pressure from Bethmann Hollweg, the chief of the naval staff demanded that measures be taken to avoid any mistaken sinking ("accident") under all circumstances. This assurance could not be given either by the commander in chief of the fleet or by the commander of the naval corps in Flanders. Even the latest incident (the *Sussex* case) had shown that even while conducting the submarine warfare in accordance with the rules for prizes, such mistakes might still occur. In that case, the steamer had been distinctly recognized as a naval auxiliary vessel, and attacked. It can not be agreed that the commander of the northern forces could have followed the example of the forces in the Mediterranean and carried out this warfare in accordance with the rules for prizes, since the conditions in the Mediterranean, where America was not involved, were entirely different from those in the northern areas.

As it transpired, the period from April to fall, 1916—aside from the Mediterranean—must be designated as a period of complete suspension of the submarine warfare, as differentiated from the foregoing period, which might be termed one of conditional suspension. It is evident that such a complete suspension of operations in the war zone could not be long endured, since this breathing spell gave the Entente the opportunity to recover from their pressing need of shipping, and permitted a period of undisturbed development of the antisubmarine offensive, which was later to result in a considerable hampering of our submarine activities. Therefore, the

submarine operations were again renewed by the naval corps in Flanders in September, and by the High Seas Fleet in November, 1916; in both forces in accordance with the rules for prizes.

Much valuable time was lost as a result of the extraordinary care to prevent "accidents," which were still only a pretext for America's attitude and not the real reason therefor. The spring of 1916 was the proper time for us to have initiated the unrestricted submarine warfare.

When we were able to show by our estimates that the unrestricted submarine warfare begun in the summer of 1915 would have very probably led to success, we may say that such warfare initiated in the spring of 1916 would certainly have resulted victoriously, although with each passing month the problem would have been more difficult.

With regard to the number of submarines available, we were at that time in a much more favorable condition than in those days when we risked beginning this warfare for the first time (February, 1915). In the spring of 1916 we had not only 27 boats, but 68 in service at the front. Above all, the increase due to new construction which was to begin in March, 1916, was immediately available; this comprised 141 new submarines, of which 10 were to be delivered monthly from March to December, 1916, and which were actually delivered in accordance with the program. Even in comparison with the number available in the summer of 1915, which we have designated as the earliest moment for the proper initiation of the submarine operations, the numerical balance is in favor of the spring of 1916. As a matter of fact, we were never in a more favorable position in so far as the prepared increase in strength of forces was concerned. It has been emphasized several times that the probable success of the submarines should not be judged by their number alone, but when we consider the enemy antisubmarine measures, it is apparent that these did not become really effective until the years 1917 and 1918. Thus, it may properly be said, that the chances for success in the spring of 1916 were about three times as great as in 1917, and would, therefore, have certainly led to a victory. The neglect to utilize this favorable period, which once more must be attributed to the political leaders acting against the protests of the military authorities, resulted in lengthening the war several years and making our chances of success uncertain. This fact has also been affirmed by enemy ministers and enemy military leaders. In the establishment of this fact lies a grievous tragedy which every German will appreciate.

Even from an industrial standpoint the spring of 1916 would have been a favorable moment for beginning such a campaign of unre-

stricted submarine warfare, as very properly stated in the memorandum of the naval staff of 12 February, 1916 (the second, in which the industrial experts concurred). The warfare in accordance with the rules for prizes could not approach the results obtained with the unrestricted warfare, even though the first only reached its full development in the Mediterranean.

Of the particular achievements during this period there is, of course, little to be recorded. Among these, however, was the sinking of the English cruiser *Hampshire*, due to running on a mine field near the Orkneys on 3 June, 1916, which had been laid by the *U–75* (Lieut. Kurt Beissen). As a result of this, Lord Kitchener, the organizer of the Continental Army, the advocate of the Dardanelles Campaign, and many other undertakings, met his death. Whether all these operations, which were accompanied by great loss of life and sacrifices, were really of great service, may be doubted to-day, as one is rather inclined to the view that England would have fared better in every respect had she conducted her operations more on the seas. In the words of an English contemporary, Kitchener was neither a "Napoleon nor a Moltke, but was rather a great administrative officer" whose extraordinary domination, even in matters of strategy, did not always result to England's advantage.

In the Mediterranean there was still an opportunity for an efficient submarine commander to distinguish himself in the commerce warfare. Thus, in May, an extended cruise of the *U–39* (Forstmann) resulted in sinking of 53,000 tons, while in August the *U–53* (von Arnould de la Periere) attained the figure of 91,000 tons on one undertaking. Four other boats were thereupon very properly sent from the High Seas Fleet to the rich and promising zone in the Mediterranean (*U–32*, *U–63*, and *U–65*). But even those boats which were retained for service in home waters and which were restricted to mine laying and offensive operations against warships, while envying their comrades in the Mediterranean, were soon to find promising activities on the north coast of Norway and in the Arctic Ocean. There a lively traffic in munitions had been inaugurated to the Murman coast and Archangel, which began to make difficulties for our armies on the eastern front. This traffic was then energetically attacked by our submarines in that the *U–43* (Jurst) and the *U–46* (Hillebrand) and *U–48* (Buss) sank a large number of steamers, of which many were carrying munitions. Some idea of the importance of these exports for the conduct of the war can be obtained from the figures giving the known cargoes of these vessels. Thus the *Sucham*, which was brought into Wilhelmshaven by Buss, had about 7,000 tons of munitions aboard, while the cargo of the

Bistritza, which was sunk by Jurst and destined for Rumania, contained the following articles: 12,500 7.5-cm. shell; 200,000 other shell; 576,000 machine-gun shell; 338 tons of explosives; 10,000 rifles; 100 machine guns; 20 Mausers; 93 automobiles; 14,000,000 cartridges. Further, there were steel helmets, observation balloons, aircraft parts, steel bars, and much other material. The cargo alone was worth 40,000,000 gold marks. When one considers that during the war hundreds of such steamers carrying munitions were sunk by our submarines, one can appreciate how much this warfare relieved the pressure on the armies at the front, from this standpoint alone.

In the fall of the same year, the *U–53* (Rose) made his celebrated trip to North America (17 September, 1916), which was initiated in connection with the expected arrival of the second commercial submarine *Bremen*. The standing out of this heavily laden submarine—fuel oil, provisions, etc.—was in itself quite an undertaking, since it was loaded far beyond the normal capacity. Of this trip, more later.

In this connection should be recorded the commercial submarines, which represented an ingenious experiment on the part of the merchant marine (*Lohmann* and *Bremen*), the object of which was to obtain provisions for us from North America in spite of the English blockade (*Bremen* and *Deutschland*). The *Deutschland* made two successful trips to America (Konig) while the *Bremen* was lost on her first voyage, not as a result of enemy measures, but probably due to diving with open hatch or some other technical failure. After the entrance of the United States in the war, these boats were converted into submarine cruisers designated *U–151—U–157*. With bold commanders these cruisers also accomplished good results in the cruiser warfare, but were difficult to handle as warships.

For the rest, there is little more to record of this period of depression in the submarine commerce warfare, although several commanding officers made the greatest efforts to overcome the hindrances due to to the restrictions placed on their activities by every possible means where opportunity offered (in the Bay of Biscay, Spanish west coast) for example, by capturing prizes to take on the crews of the sunken vessels. The extent of the danger which we inflicted on ourselves as a result of our diplomacy is evident from a report of the *UB–18* (Steinbrinck), which boat lay near the mouth of the Seine and Le Havre in July, 1916, and was forced to allow 41 ships to pass without firing a shot, since they were disguised as harmless merchantmen, while in reality these vessels, in the nature of the situation, were being employed as enemy transports. But even this report failed to bring about a relaxation in the existing orders, which were put in effect with the idea of avoiding any inci-

dent which would lead to conflict. Imagine the commander of an army being forced for diplomatic reasons to avoid attacks on the enemy line of communications although this passed over enemy territory. Such in fact was the English Channel. Would not that course be suicidal? Such was our course of action in 1916.

3. UNRESTRICTED SUBMARINE WARFARE

On 9 January, 1917, with the help of the high command of the army, the decision was reached to initiate the unrestricted submarine warfare, to which the Chancelor gave his approval. Matters had now reached such a pass that a decision on the mainland could no longer be expected—a hope which was maintained too long. Thus the unrestricted warfare represented the last possible opportunity to bring about a victorious peace, even though the hostility of America, which was even then supporting the Entente with money and munitions, had to be risked. Although in taking this action on 9 January we broke our promise to America. This was justified since Wilson had not fulfilled the conditions demanded when this promise was given, and we had reserved freedom of action for ourselves in such an event. To-day, no one can doubt the correctness of this decision, since it is evident that America would have openly declared war on us, even though we had not commenced the unrestricted submarine warfare (see, for example, Wilson's reply to the question of Senator McCumber, section 8, subdivision 2). With this long period of temporizing, we only lost valuable time without accomplishing anything toward averting the American offensive.

This new campaign began on 1 February, 1917. The course of the war seems to indicate that this date must be characterized by the terrible words "too late." Was this a fact and could this fact have been appreciated at that time? Both may be answered in the negative. It has been frequently assumed that American assistance saved England and the Entente, and it must be admitted that this help was of the greatest importance, also in a military sense, and particularly at sea, although very little mention of the fact is made in English naval histories. It is certain that the entrance of America into the war brought to England a vast amount of material for the antisubmarine offensive, which England alone could never have procured and which increased our difficulties to an extraordinary extent, but it was never of decisive importance. The American construction of ships for replacements was, as admitted by a very frank American, a gigantic bluff, which had its principal value in its influence on the German state of mind. The reasons for our failure to obtain our objective with the submarine

warfare, as will be shown later, lay with ourselves, although that could not have been foreseen in February, 1917, least of all by the submarine commanders. The submarine crews jubilantly greeted the decision of 9 January, 1917, which was finally to free them from a thousand difficulties and give them a clear-cut mission, although they themselves appreciated the great difficulties yet to be encountered and realized that they might be called on to pay with their lives for the consequences of the previous neglected opportunities.

The author does not intend to imply that everything which took place in the line of military operations was correct and unassailable, as might be assumed from the foregoing, but rather intends to expose these errors in order that a lesson may be learned from them. The principal mistake which we made, in good faith, was the one already mentioned of carrying over the estimated period of six months for a successful termination of the unrestricted submarine warfare, from the spring of 1916 to the year 1917. That should not have been permitted, owing to the increasing possibility of disappointing our own population. But this limitation, in time with respect to the decisive effect of our submarine operations, resulted in certain military disadvantages, which shall be the topic of discussion in this chapter. On the one hand, the idea took root in the Navy Department—which always gladly avoided new construction—that further building would be useless in view of the early end of the war, while on the other hand, the active submarines at the front felt the obligation of making good the promise given by the naval staff. At any rate, the submarine operations in February, 1917, were begun at a rapid pace, which led to the maximum possible results being attained for the submarine quota. The line of march was shortened, with some danger to the boats, while special orders were issued for the methods to be employed in the war zone with the view of making each cruise short and effective and thus increasing the efficient operation of the submarines.

After the opening of the unrestricted submarine warfare, the results attained increased very rapidly, and soon reached a point which even exceeded our expectations (see table). In April and June, 1917, this figure almost reached a million tons. Of the submarine commanders who especially distinguished themselves during this period, should be noted: Rose, Schweiger, Wunsche, von Georg, Dieckmann, Adam (North Sea), Steinbrinck, Pustkuchen, Wassner, Loss, Howaldt, Salzwedel, Viebeg, Hundius (Flanders), von Arnould de la Periere, Forstmann, Valentiner, Spiess, von Mellenthin, Hartwig, Steinbauer, Rucker (Mediterranean), and many others. As a result of the extraordinary efforts which were

made and the increasing counteroffensive, our losses soon began to increase, among which are noted: *U–28* (Georg), *U–44* (Wagenfuhr), *U–45* (Sittenfeld), *U–48* (Eveling), *U–50* (Berger), *U–59* (Count von Firks), *U–69* (Wilhelms), *U–88* (Schwieger), *UB–39* (Kustner), *UB–41* (Plon), *UB–75* (Walther), *UB–81* (Salzwedel), *UC–26* (Count von Schmettow), *UC–29* (Rosenow), *UC–30* (Stenzer), *UC–42* (Hans Muller), *UC–44* (Tebbenjohans), *UC–47* (Wigankow), *UC–51* (Galster), *UC–66* (Pustkuchen). Unfortunately, the list of losses given here is still not exhausted.

In the fall of 1917 a new type of submarine appeared on the scene, the submarine cruisers, which extended their activities to the heretofore unoccupied zones of warfare, such as the coast of North America, the west coast of Africa, and the Azores, etc. The submarine cruisers were divided into two classes: Those comprising the converted heavy-draft commercial submarines *U–151*—*U–157*, and the specially designed submarine cruiser of which, however, up to the revolution, only the *U–139* and *U–140* were able to see active service. Even these two boats, the forerunners of a new type, had to suffer from the usual run of "infantile diseases." Two improved types of submarine cruisers (see table) were unable to come to grips with the enemy. The submarine cruisers available during the war made eight different cruises to the coast of America, near Dakar (West Africa) and the Azores. These cruises brought good results in themselves—mostly about 30,000 tons, the record being held by *U–155* (Eckelmann) with 50,000 tons—and were chiefly important in the out-of-the-way areas where their activities were little disturbed by the enemy counteroffensive measures. On the other hand, their effectiveness was reduced by the relatively small amount of traffic in those areas, and the length of time consumed in going and coming. In spite of the alertness and undeniable efficiency of the commanders of these submarine cruisers, one can not designate this submarine cruiser warfare as a rational solution of the problem, owing to the long overhaul periods required, since the results attained by a smaller submarine operating in the waters around England was twice as great, with a smaller expenditure of personnel and matériel. However, everything depended on increasing the amount of tonnage sunk. The expected frightening of America failed as a result of the small number of submarine cruisers available. There is, in fact, nothing against the submarine cruiser as a type, but in our geographical situation in the vicinity of England, where all commerce lanes converged, and in view of the haste imposed on us to force a decision, it was incorrect for us to attempt to extend our submarine operations as far as we did with our submarine cruisers.

Thus with this matter as with many others—a fundamentally sound theory inspired the technical experts, such as we had in Germany and still have, to a great extent, while the final product was still impracticable, since it was not fully adapted to meet the demands of the campaign. This fault is not to be charged to the technical experts as much as to the administrative authorities, who are accustomed to work along theoretical lines without sufficient contact with the practical end. This error made its appearance as a result of our faulty organization in that the submarine cruisers were contracted for by the naval staff in Berlin.

On the whole, the submarine warfare exerted a powerful influence in the spring and summer of 1917, and in England people began to reckon on the 1st of November, 1917, as the date on which England would collapse under the blow delivered by the German submarine offensive. But let us hear from the enemy leaders themselves on this matter.

Admiral Viscount Jellicoe, then the first sea lord (since 5 December, 1916), speaks of the extreme gravity of the situation at that time (the crisis in the naval war): "A full knowledge of the extremely critical situation, the worst in the history of England, would have undermined the necessary public confidence in our victory. The facts could, therefore, not be made public if we were to avoid giving the enemy an advantage. But those who had to look on from day to day as our cargo space was being increasingly diminished by the enemy were filled with grave fears for the future. They had every reason to blot out the tragic consequences of those dark days of the unrestricted submarine warfare. * * * At that time we were not sinking the submarines at the necessary rate, since many new submarines were under construction in Germany. Our merchant shipbuilding was extremely small," etc. * * *

The American Admiral Sims, however, wrote in those days to the American Ambassador Page (in the chapter in his book entitled "When Germany was winning the war"): "The fact remains that the enemy is successful and we are not. Our ships are being sunk faster than they can be replaced in the shipyards of the world. This means simply that the enemy is about to win the war. That is no secret. In a short time the submarine will cut our lines of communications. When these are cut or sufficiently damaged we shall be forced to accept the conditions of the enemy." To his own Government the Admiral telegraphed "in short, we are about the lose the war at any time, in my opinion."

Even more convincing than these definitely expressed views is the description of the impressions received by Admiral Sims on his arrival in London (April, 1917). Here he discovered to his horror

that the impression he had received in America was radically wrong, and "that the Germans were not losing the war, but would win it." On the day of his arrival he had an interview with Admiral Jellicoe (first sea lord), who told him that the total losses in February were 536,000 tons, in March 603,000 tons, and that in April a figure of 900,000 tons would probably be reached. The Admiral "was astounded; he had not imagined such a terrible condition."

When the Admiral expressed to Jellicoe his dismay at the news, the other quietly replied "Yes, if the losses continue at this rate we shall not be able to carry on the war." Sims then said "It looks, then, as though the Germans were going to win the war." Whereupon Jellicoe said: "They will, too, if these losses can not be prevented, and that, very soon." It is known that the Entente could not reduce these losses for some time, and at that time could not stop them at all, as these reached more than 600,000 tons per month up to December, 1917. But other circumstances, which we at that time did not even suspect, operated to save the Entente; of that, later. It will be noted here that the sinkings were maintained at a point above the objective for a period of 11 months. The submarine service was increased in strength from 100 to 132 boats; while the losses which averaged about five boats every month were more than equalized by new construction. This, however, did not satisfy the senior officers at the front, who foresaw greater difficulties yet to be overcome, and at their instigation there was founded the submarine bureau (Vice Admiral von Mann, von Tiechler) against the opposition of the Navy Department. This newly created bureau controlled all matters pertaining to the submarines and had final authority in all submarine matters in the various bureaus and offices in the Navy Department. By efficient work and contact with the industry, this submarine bureau finally succeeded in letting contracts from time to time until over 300 submarines were under construction. The full effect of the work accomplished by this bureau, which began to be apparent in the late fall of 1918, was brought to naught by the revolution.

In the year 1918 a constant increase in the number of submarines could not be obtained. Only those boats for which contracts had previously been let at irregular intervals were delivered for active service, while the number of boats at the front varied from 112 to 128 from January to November, 1918, the highest number being reached in that fatal November, while from this time on a regular monthly increase of from 13 to 22 boats would have been assured, thanks to the activities of the submarine bureau. As matters stood during the first 10 months of the year 1918, the reduction in boats on active service by losses exceeded the replacements due to new con-

struction and the demand for training boats. The losses which in 1917 averaged five boats per month increased on the average to eight boats per month in 1918, but this was not a constantly increasing figure, since it varied from month to month and reached a maximum in May, 1918. These losses might have been diminished, in all probability, had we promptly abandoned the bases in Flanders after the English had succeeded in barricading the Straits of Dover, since the Flanders Flotillas bore more than half of the losses which occurred during this period (end of 1917). But since the submarine forces at this point furnished the protection for the right flank of our army on the western front, this could not even be considered. Such an abandonment would have been made with a heavy heart by the submarine personnel at those bases, since they had built up and defended the celebrated base by their own great efforts.

It is clear that without a measurable increase in the number of submarines in active service the successes must diminish in the face of the increasing antisubmarine activities on the part of the enemy and the growing lack of objectives for attack. The sinkings again reached the desired number of 600,000 tons during the month of March, 1918, but after that they fell off appreciably. But in spite of this, the influence of the submarine activities still continued to be felt, since the lack of cargo space afloat was more and more in evidence as time went on, while our enemies were never able to adequately restrict the submarine activities or bring their antisubmarine measures up to the desired point, although millions of men and immense quantities of matériel were diverted for this purpose. These antisubmarine activities had to be further and further extended as the war progressed and were never satisfactorily completed.

The year 1918 was undoubtedly the most difficult encountered in the course of the submarine campaign. In the home waters this reached a point where almost the entire High Seas Fleet was in the service of the submarine force, since the mine sweepers, which were charged with the duty of maintaining a free passage for the entrance and departure of the submarines, had to be supported by destroyer flotillas, which in turn were supported by the light cruisers, while the latter were further supported by at least one division of battleships, held in readiness. With such a large force employed to support the activities of the mine-sweeping division, which in favorable weather were engaged in the operations in several areas at once, there can be no talk of the "inactivity of the High Seas Fleet." This continuous and, for the larger ships at least, monotonous and thankless

task, meant grave danger to the smaller craft (torpedo boats and mine sweepers) as well as valuable experience; the losses sustained due to enemy mines were extremely large.

The activity of the submarine bureau had opened the eyes of the Navy Department to the fact that the industry could be utilized to a much greater extent than heretofore, in that the industrialists were drawn into active cooperation in the manufacture of certain of the submarine parts. This was carried out on the part of the submarine bureau with such success that the December contracts for 120 boats could be followed by further contracts for 220 additional boats in June, 1918. That the output of the industry might be considerably increased by the employment of technical experts and skilled workmen from the army was appreciated at this time, but the efforts made to convince the high military command of this necessity (Ludendorff and Hindenburg) failed because the navy, with their unfortunate organization, did not present the solid front which was essential if such a concession from the army was to be obtained. A centralized and coordinated organization was entirely lacking. Even to-day, however, we must concede the fact that it is doubtful if the army would have been willing to release these trained workmen in sufficient numbers even had the conditions in our Navy Department been better (end of 1917). The high command of the army had agreed in the fall to the unrestricted submarine warfare, but were not inclined to make any sacrifices for this purpose, while the skilled workmen which the submarine industry needed could hardly be spared from the arsenals and special details in the army. In order that the submarine warfare should be prosecuted on a large scale, with the necessary matériel reserve, it might finally necessitate the partial restriction of the military operations ashore, or even that these be suspended. This principle was formulated by the naval authorities, but in the nature of things could not be made effective.

How much more might have been accomplished by the submarine campaign when all necessary technical assistance and personnel was made available for this service was shown toward the end after the organization of the naval command under Admiral Scheer (11 August, 1918). This change in organization was effected for the purpose of filling a long-felt want of unity of command in the first place and finally in order that the necessary contact with the army might be established. Admiral Scheer regarded his primary mission as the prosecution of the submarine warfare on a large scale and for this reason immediately put into effect a submarine-building program to meet the demands of such a campaign. In the nego-

tiations with the industry it was shown that an average monthly increase in the submarines of 16 could be obtained, and that this number could then easily be increased to 20, 25, and finally 30. Thus in this manner it would have been possible to prevent a further reduction in the monthly record of ship sinkings, and the submarine campaign could then have been carried through to a successful end. We shall come back later to a consideration of the important conference with the industrialists which took place on 1 October, 1918, in Cologne, where it was proven that in this fifth year of the war the industry was capable of astonishing assistance, while the support of the army technical personnel was assured, in principal, at least.

The fact that the Scheer program could be initiated immediately, with a large number of deliveries monthly, is to be attributed entirely to the service rendered in preparation therefor by the Submarine Bureau under Vice Admiral Ritter von Mann.

As opposed to the hopes which were raised by these measures the collapse of the submarine campaign was already preparing, not from within itself, since the boats and personnel were entirely sound, but as a result of the train of political events which transpired in the fall of 1918. As early as 29 September the high command of the army had decided on the evacuation of Flanders. This meant for the submarine campaign the loss of the very important base at Brugge, whose importance did not lay so much in the strategic position it occupied, since the English had by then barricaded the English Channel, but in the valuable accessories and the efficient work performed by the torpedo boat and submarine docks at Brugge. The evacuation was carried out in accordance with the plan, but four submarines which were not in readiness for sea had to be blown up. The remaining boats were placed under the command of the commander submarine forces of the fleet. The loss in submarines was even greater when the bases at Pola and Cattaro had to be evacuated as a result of the collapse of the Danube Monarchy. Ten boats had to be blown up in these harbors (28 October), while of the boats which stood out to sea one (*U–54*, Klasing) did not reach its destination. The unbroken spirit and bold front presented by these submarine crews, in spite of the tragic events which were closing in on them, is evidenced by the fact that the *UB–50* (Kutak) on her cruise home took time to sink the British battleship *Britannia* near Gibralter. The loss of Pola and Cattaro meant the sacrifice of two other very valuable submarine bases, which was all the more tragic, as the submarine bureau had just succeeded in making the needed extensions to the repair shops there, after a disastrous delay, when the activities of the submarines in the Medi-

terranean were forced to cease. In the end, however, the loss of the bases in the Adriatic might still have been borne, since the submarine bureau had undertaken the energetic rebuilding of the home repair shops and additional bases were in the process of construction.

Meanwhile the course of political events was hastening to its tragic end. In Germany a new government under Prince Max of Baden was in power, which on 5 October requested President Wilson to undertake peace negotiations and thereby took the path that led to destruction. These matters have been discussed in the previous chapter, and we will content ourselves here with a few remarks on the attitude of the submarine service toward the revolution.

When the revolution broke out in the High Seas Fleet, on 29 October, in that a number of the battleship crews refused to put out to sea to meet the enemy--the agitators had instigated certain of the crew to take this cowardly action—these ships were threatened by the torpedo boats and submarines with immediate sinking, and thus brought to obedience. The mutinous ringleaders were arrested and taken off the ships, but this success was lost when the individual detachments of the fleet were dispatched to their home ports or other bases. There the crews felt themselves removed from the disciplinary control of the commander in chief, while contact was reestablished with the revolutionary leaders in the organizations ashore, from whose offices the revolutionary propaganda was disseminated, and these again revived the mutinous spirit. One especially disastrous fact was that the arrested ringleaders who were being taken from the High Seas Fleet encountered a number of the crew returning from shore leave and were set free by these men. The mutiny again flared up in all the naval stations, beginning at Kiel. In Wilhelmshaven the fleet command and the commandant of the naval station were forced to treat with these "soldiers and workmen's councils," owing to the overwhelming numerical superiority of the revolutionaries and the fact that the population was in sympathy with the movement. The submarines which were ready for sea withdrew from this capitulation under the orders of the commander submarine forces, Commodore Michelsen, and sought shelter in some port still under the imperial ensign, first in Helgoland and then Westerland. This effort failed, since the commandant of these island fortresses were no longer in control of the situation and provisions and munitions could no longer be obtained from them. Even in Borkum the submarines found a hopeless situation. After putting to sea again in the German Bight, on the telegraphic report of the sighting of the British Fleet without encountering the enemy, the commander submarine forces was

finally compelled to send the submarines back to the revolutionary ports, owing to the lack of fuel oil and provisions. A large number of the crews immediately went to their homes, but had to be called back into service again to undertake the heartbreaking duty of surrendering their trusted boats to the British. With this painful mission accomplished, the submarines ended their military activities.

Chapter IV

ANTISUBMARINE MEASURES

In order to understand the fighting tactics of the submarine it is necessary that some information be given regarding the counter offensive measures which had to be combatted. Such measures were not only encountered on the part of the merchant ships which had to be attacked and which were equipped with all manner of defensive and offensive means, but included further the employment of an immense organization, requiring a tremendous amount of matériel and the services of a large personnel, which exerted its influence not only on the submarine warfare but on the entire conduct of the war. This refers to the last years of the war, since at the outbreak of the war and for two years thereafter there were no effective means available to combat the submarines and the antisubmarine measures which existed, which were so cheerfully praised by the English writers to prove the foresight of the Admiralty, were too childish for serious consideration. In general, these consisted of light nets which were to be laid across the nose of the submarine by the ship's boats when an attack was threatened, and if it is really true that in the English peace-time maneuvers this or that submarine was "caught" in such a net or forced to the surface, it may be attributed to the desire in peace time to avoid fouling the propellers.

According to Admiral Jellicoe, in whose book "The Crisis in the Naval War," we are thoroughly informed on this subject, all of the measures taken to combat the "submarine pest" up to December, 1916, were hopes and projects, such as the introduction of special bombs, which were fired from howitzers and exploded under water, the depth charges, the employment of aircraft against submarines, listening devices, etc. The strictly defensive devices had been somewhat further developed (smoke screen apparatus, protective nets, etc.), but even these had not been fully developed up to the end of the year 1917. We are informed by Jellicoe and from other English sources that not until December, 1916, was the systematic development of antisubmarine devices undertaken (establishment of the antisubmarine division in the Admiralty), and the naval command was not organized to combat the submarine menace until New Year's, 1917, so that important devices for offensive

operations against submarines could not be made ready before well into 1917 and 1918, while some of these devices were still incomplete at the conclusion of the war. From this it follows that our submarine warfare begun earlier could not have been countered, in spite of all efforts, with anything like the success which was obtained in 1917.

The military antisubmarine measures are described by Admiral Jellicoe in his book which was published in 1920, and by the previously mentioned book of Admiral Sims "Victory at Sea." These were as follows:

1. DEPTH CHARGES AND DEPTH CHARGE GUNS

In the year 1917 there were two types of depth charges with 54 and 136 kilograms of explosive, respectively (trinitrotoluol). Every patrol vessel was supposed to be equipped with four such bombs, much too few, but even this number could not be delivered at first. Not until 1918 did the destroyers receive their proper quota (30–40 per boat). The depth of the explosion was insufficient at first and the smaller bombs proved to be inadequate. But even the larger bomb, 136 kilograms, had to be brought to explosion within about 9 meters of the submarine if effective action was to be obtained; within 20 meters one hoped to obtain a certain "moral" effect on the nerves of the crew of the submarine.

The bomb-throwing guns (Y guns) which permitted the depth charges to be dropped close to the submarine, were first introduced in July, 1917, and by 1 December, 1917, there were 238 of these in service. These were further supplemented by howitzers, which could fire a charge at greater distances (between 1,100 and 2,400 meters) at a submerged submarine, and which then exploded a charge of 45 kilograms under water. The principal difference in these two types was the fact that the depth charge was effective at short ranges, owing to the explosive effect, while the howitzer shell was supposed to be more effective at long range through the action of the splinters.

2. UNDERWATER LISTENING DEVICES (HYDROPHONE)

These devices were supposed to overcome the advantage which the submarine obtains as a result of its invisibility, and to substitute the ear for the useless eye, so that submarines which could not be seen might be heard. Such devices were developed by us before the war, and these even permitted our ships to communicate with each other under water in 1914. But the devices required for this purpose were something different, and it was now a question of

being able to distinguish the noise of pumps, propellers, etc., and to determine the direction of this noise from several vessels operating together, by means of such listening devices. Then only was it possible to "cut in" the position of the submarine and make the attack.

Hydrophones, which permitted the direction of the source of sound to be determined with some accuracy, were not available until toward the end of the year 1917, and since the training of such observers was very difficult, adequate accuracy in the determinations was not attained until well along in 1918. In regard to the English hydrophone, the results obtained were more or less doubtful, since the problem was made even more difficult by the requirement that the observing vessel should make the determination underway, instead of dead in the water, and the propeller noises of the listening vessel interfered with the noises to be located. The English listening devices were the "Nash Fish" (so called from the inventor, Nash) and the eel type, to which other "directional" types were added in the fall of 1917, which were probably copied after the American models or were improvements.

The American simplified the problem from the start by requiring the listening vessel to stop dead in the water for observations. After the observed bearings of the sound had been plotted on the chart, the listening vessels (usually three) then approached the point of intersection in open formation and stopped again, after taking in the listening devices. Thereupon, further observations were made, until the proper moment for attack was at hand. The American devices were known as K tubes and C tubes, of which the former was constructed for larger vessels and the latter for smaller craft. According to Admiral Sims, these devices were measurably superior to the British devices, since the K tubes permitted the determination of the direction of the sound at distances as great as 20 miles, under favorable conditions. Without doubt these devices certainly made life difficult for some of our submarines and at times materially assisted the enemy in their operations against them.

For the greater part, the craft which were equipped with these devices were small, fast boats, not very seaworthy, having a speed of as much as 30 knots, but with a small radius of action (24–30 miles). The Americans called these boats "subchasers," while the English employed these devices on drifters (craft used for patroling the nets) and on the P-boats, as well as the C. M. B's. and M. L. (motor launches), which corresponded to the American subchasers. All of these craft were organized into groups, which constantly searched the coastal waters in the vicinity of the submarine operations areas. These were then further supplemented by listening buoys in those

areas, whereby the propeller noises of submarines were picked up by the device on the buoy and made audible at the shore observation stations, which then notified the subchaser patrol force in the vicinity. At the end of 1917 there were 12 such hydrophone stations in service, while more were added during 1918.

In addition to all these devices there must be noted the research and training stations for the submarine listening devices. A good idea of the extent of such development can be obtained when we read that in England alone over 100 officers and 2,000 men were under training in these schools for listening pursuit.

3. AIR FORCES

These were also employed in the operations against submarines, but not until after 1917, since before that time there was no suitable type of either airship or airplane available for this purpose. The airships employed for this purpose were of the small nonrigid type. These were little adapted for offensive measures, but were particularly useful for making observations and informing the surface craft of the location of the submarine, whereupon the latter craft took up the pursuit. They were also of value with convoys in detecting the presence of the submarine and permitting them to promptly avoid the danger. In judging the value of such airships, one must remember that they were essentially fair-weather craft and could be employed only infrequently. With all due respect for the service rendered by Count Zeppelin, it must be realized that the airship can never overcome this greatest weakness, and, therefore, will never be an independent weapon except under very favorable conditions.

A grave threat for the submarines was furnished by the airplanes, after the heavy hydroplanes had been abandoned in favor of the lighter airplanes, which were equipped with heavy bombs. For this reason, the airplanes first became a real menace to the submarine toward the end of the year 1917, since up to that time the antisubmarine air offensive was not undertaken, and even this was not completely developed when the war ended. There is no doubt that the assistance of America in this field was very effective, in particular as such undertakings were in accord with the American desire for large scale measures. When the Entente succeeded in occupying all of the important coast stations with airplane squadrons and carrying the air offensive to Brugge itself, this was due to a great extent to American enterprise, and for that reason little mention is made to the fact by English writers.

In June, 1917, the first American air squadrons arrived in France, and in the early part of 1918 the American Navy took over the first

naval airplane station in England, but by the end of the war the American planes had been increased to over 500, with 2,500 officers and 22,000 men. This tremendous achievement was only possible as a result of the fact that the foundation for this organization had been laid in 1916, as related by Admiral Sims, and the instructors trained in time of peace. This need arouse no wonder to-day, since in 1916 Wilson reached the decision to take measures against Germany in the event of England being threatened with defeat, and this fact need no longer be kept secret. Before the end of the war, the Americans in France had established 6 air stations, 3 airship fields, and 3 captive-balloon stations, with all accessories, including the "northern bombing group" (bombing squadrons against Brugge). This comprised alone 112 airplanes with 305 officers and 2,000 men in this service. The American Aircraft Works (for construction and repair) was located at Pauillac, where 20,000 men were employed, but at the end of the war it was not yet in full operation. The successes of the American aircraft against submarines—against which they were principally employed, although some were loaned to the Army—are reported by Sims as 10 (out of 39 attacks) for the airplanes. This number is probably estimated a little too high, although it can not be doubted that all of these aircraft employed against submarines certainly seriously hampered the submarine activities, even though these boats were later equipped with "zenith periscopes" (in order to see the sky).

Still are to be noted the captive balloons, which were held or towed by destroyers in the important observation zones, and particularly encountered in the Straits of Otranto. These served to increase the range of visibility, which was restricted on the low-lying surface craft, and permitted the observer to warn the personnel promptly in the event of a submarine sighted. They were not essentially an offensive measure.

4. SUBMARINE TRAPS

The enemy called such vessels "decoy ships," or abbreviated "Q ships." These evidently were evolved from the idea that if one could hide a warship under the harmless disguise of a merchantman flying a neutral flag, such a craft could be successfully employed against the submarines. These vessels gave great promise of success as long as the submarine warfare was conducted in its restricted form—i. e., as long as the submarines were forced to come to the surface to investigate a steamer before any offensive means could be employed. The fact that this procedure was in violation of international law was entirely disregarded. In the English Admiralty there was established a special office for the selection, arming,

and fitting out of such vessels as well as providing the personnel, which worked with good effect. From 1915 to 1917, ships of all kinds and sizes, steamers and sailing vessels, were converted to this purpose (as submarine traps). From the end of 1917 on these activities were restricted, owing to the pressing need of cargo space, and the fact that in the unrestricted submarine warfare (torpedoing without warning) there was grave danger to the larger traps, and all the more in the case of the smaller boats, since the submarine commanders were afraid of undershooting the target as a result of the light draft, and would, therefore, be forced to come to the surface. The armament of these submarine traps was so carefully concealed that even a visitor on board such a ship in port could not recognize her true character, and a careful examination through the periscope would fail to reveal anything suspicious. On the other hand, the deck houses, etc., which concealed the armament, had to be made collapsible by knocking down, so that the battery could be made ready on instant notice. Many of these submarine traps were equipped with submerged torpedo tubes in the event that the submarine remained under water. The crews of these submarine traps naturally did not wear uniform, and were made to appear as helpless and defenseless as possble, some attired in women's clothes, and were not permitted to render military honors, etc., in order that the real nature of the warship might not be recognized. During the night, the appearance of the submarine trap was usually altered, in order that suspicion might be averted due to the continual occupation of a definite area, since merchantmen, of course, do not interrupt their voyage. Naturally, such vessels could not be without success, but this initial success diminished rapidly soon after the first submarine escaped from such a trap. A further blow was delivered to these traps by the inauguration of the unrestricted submarine warfare, whereupon the traps had to run the risk of being torpedoed without warning—for this reason, they were made as unsinkable as possible, but even then a torpedo explosion would put out of commission the delicate apparatus installed which was necessary to their success. After the middle of 1917, no more submarine traps were employed, to the best of my knowledge. The British submarines were a special kind of submarine trap when they operated in conjunction with fishing vessels. In the year 1915 they were twice successful in this manner.

On the whole, about 12 submarines were probably destroyed during the years 1915–1917 by such submarine traps, an undeniable success, which, however, may be attributed to a great extent to our restricted form of submarine warfare up to February, 1917.

5. SURFACE CRAFT

Up to the year 1917 there was a great lack of such boats which were adapted to submarine pursuit on the surface, and this deficiency was only gradually overcome with the help of America.

The most serviceable type appeared to be the fast torpedo-boat destroyer, which, however, could hardly be spared from the English fleet as long as the German fleet remained intact. Therefore, they had to content themselves with old destroyers, armed fishing vessels and yachts, vessels which were too slow for the purpose intended, as they could not reach the place of submergence of the submarine with sufficient rapidity. In this lies the proof that one can not conduct a submarine campaign without a battle fleet, which is able to bind the auxiliary forces of the enemy fleet. Naturally, the English realized very well their lack of such "subchasers" and made every effort to supply this deficiency by means of new construction, but the shipyards were already overtaxed and very few of the patrol gunboats (a type of trawler, with silhouette similar to a submarine) and coastal motor boats which were adapted for this purpose, could be delivered. Although during the year 1916 there were 96 new destroyers built in England (the next year there were 69), this increase was entirely absorbed by the demands of the convoy service, and the deficiency in subchasers remained. The subchasers which were ordered by France and England for construction in America appeared on the whole to be too small—they were at first only about 26 meters long—and were not very successful. About 500 such craft were ordered, which could only be used close inshore in very favorable weather. These boats could not successfully combant a submarine. The American subchasers were much more effective, as they were about 37 meters long and sufficiently seaworthy to be able to make the voyage from America to Europe under their own power, although the weather was very severe at times. They proved themselves dangerous opponents to the submarines after the listening devices were ready for service, on account of their speed and their sea-keeping qualities. The first two flotillas of American subchasers were stationed in Plymouth after their arrival on 30 June, 1917, and patrolled the English Channel with good effect from the start, between Start Point and Lizard Head. They comprised 36 boats, which later operated off Brest and the Scillys. Similar flotillas were stationed at Queenstown (Ireland) and others at Corfu to guard the Straits of Otranto. Rear Admiral Sims reports a number of successes of these subchasers against submarines, of which six alone were stated to have occurred in the Straits of Otranto—which number is probably unknowingly exaggerated. When he supposes that the submarine

crews were in such fear of these subchasers that they had to be compelled to go on board by their officers at the point of a pistol, he would do better not to believe such lies. A brave enemy deserved better respect from him.

6. SUBMARINES

The English submarines, which in the beginning were employed almost entirely on observation stations near the German Bight and with the Grand Fleet, were systematically employed for operations against our submarines from the summer of 1915 on, since one came to the realization that contrary to the former beliefs a submarine could well engage another submarine. Soon English submarine flotillas were stationed in the important zones, such as the channel, around Ireland, near the Shetlands, etc., which were to lie in ambush awaiting for our submarines operating in those areas. Each enemy submarine was assigned a particular area (square) in which to conduct these operations, in order that they might not come into conflict with each other. After the middle of 1917 an American submarine flotilla also took part in this submarine hunt. The enemy submarines soon proved themselves dangerous opponents to our submarines for two reasons: First, these enemy submarines had only one mission, to attack our submarines, while our boats were charged primarily with the sinking of the maximum possible ship tonnage and could not be bothered attacking these enemy submarines. They were, therefore, forced to avoid them, which, in the nature of things, was somewhat difficult. Second, our submarines were forced to cruise on the surface as much as possible during the day in order to reach their operations area without loss of time and have the batteries fully charged for underwater attack, while the enemy submarines usually remained under water during the day and came to the surface during the night for the purpose of recharging their electric batteries. Thus the enemy obtained a great superiority over our submarines which could only be overcome to some extent by our boats remaining under water during the day in those areas where enemy submarines were suspected or else steering zigzag courses at high speed, both of which measures had their disadvantages. As a counteroffensive measure, it was frequently possible for us to lay submarine mines in the enemy operation areas, the location of which were known to our own submarines but not to the enemy and which probably accounted for a series of losses among the enemy submarines which have not been explained to this day. On the whole, the enemy submarine offensive exerted a measurable influence on our submarine activities, particularly owing to the resultant insecurity which was felt. Further, the number of submarine losses occasioned

by this offensive were in no wise unimportant; although the English often missed with their torpedo shots; we and the English set the number of losses attributed to this offensive at 19, while Admiral Sims gives the number as 20. This may seem like a small number when one considers this in relation to the losses occasioned by the mines and depth charges, but in view of the relatively small number of enemy submarines employed on this service one must admit that this offensive measure was relatively the more effective. Although in any future war the number of submarines available for this purpose will in all probability be small in comparison with the surface patrol vessels and the outlying nets, still these events show that the submarine is not only the weapon of the weaker sea power, but is also an offensive weapon for the stronger power, contrary to the formerly acknowledged doctrine.

7. MINES AND NETS

These two defensive measures are best considered together, as while they were frequently employed in conjunction with each other and since the mines were finally used to replace the nets.

The first submarine nets employed were the so-called indicator nets, which were laid out in the English Channel directly across the course of the submarines, and which drifted back and forth with the tide. After several different experiments, these nets finally carried a row of glass balls and were made of thin steel wire; the separate parts of the net being loosely joined together. The idea of these nets was that a submarine becoming entangled in the nets would carry away a portion dragging the net after the boat, while the glass balls floating on the surface would then betray the presence of the submarine to the surface vessels, and the attack could be made by means of explosive bombs or (later) with depth charges. Naturally, these nets had to be guarded by surface patrol vessels, which were allowed to drift with the nets and hence acquired the designation, "drifter." In June, 1915, there were as many as 132 of such drifters on active service in the Strait of Dover; these were engaged in their occupation on the line between Folkestone and Grisnez. According to reports this method accounted for two submarines, one of them on 24 March, 1916 (*UC–3* or *UB–15*). After the invention of the submarine net mine, the drifters were employed to supervise the stronger nets which were anchored, and to which mines were attached at regular intervals. The individual parts of the net were only loosely secured to each other, whereby the submarine in striking the net would carry away that portion, while the mine attached would be dragged against the

hull of the boat and brought to explosion. This type of net had several disadvantages. First, they required constant supervision, in order that the detonating device should be kept charged with current, a matter which was impossible of execution in bad weather during the winter storms; second, they failed to function when the submarine encountered the net steaming against the current; third, they could not be laid deep enough, since the tidal currents would otherwise tear the nets away from their moorings, and, therefore, where the depth of water exceeded 24 meters a series of deep mines had to be laid out in front of the net to prevent the submarines from passing under it. The first net of this type was laid out on 1 May, 1916, near the Flanders coast, 23 miles long from Nieuport to Blankenhead. At the end of October, 1916, however, the patrol of the net had to be abandoned on account of the severe weather, and the net was thereupon destroyed by the Flanders Flotilla. Toward the end of July, 1917, the net was replaced by the English. Even the barrier which was laid out January, 1915, from Folkestone to Grisnez was of similar construction while in addition to this a bridge barrier was also laid out with it to prevent the submarines passing over the net during the night. However, this barrier was ineffective, since there were no anchors and chains strong enough to hold it in position across the sweep of the current, and it was soon thereafter abandoned and replaced by a mine net at another place. This latter net extended from the Goodwins to about Ruytingen Lightship and was later further extended to Snow Bank (New Years, 1917) but according to English views this net did not function well (28 miles long). On the whole, these nets with mines attached probably accounted for four submarines.

Since these nets with mines were never wholly satisfactory, the enemy soon came to the idea of laying out a series of mines at different depths, which should be effective at any depth of water (mine walls) and such an arrangement was used to replace the nets. However, this attempt failed for some time for the reason that during the first few years of the war the Entente did not possess a mine which was effective against submarines. The English as well as the American mines functioned very well indeed against larger ships, but very poorly against submarines, while the depth setting device also frequently failed, permitting the mines to come to the surface, thus betraying the presence of the mine field to the submarine. Not until the end of 1916 did they succeed in developing a satisfactory mine for employment against submarines, which was copied after the German design (Type H). Up to October, 1917, however, only 1,500 of these mines could be made ready for

delivery. Finally, the deliveries were made in large quantities, and the English then succeeded in barricading the Dover Straits (between Folkstone and Grisnez) with a 10-row mine wall in December, 1917 (4,000 mines). The completion of this barirer, which was illuminated at night to force the submarines under water, was a severe blow to the Flanders Flotilla, since the advantage of their geographical position, which gave them a great superiority, was lost in this manner.

From the above, however, one should not conclude that the English neglected mine-laying operations from 1914–1918 on account of the inferiority of their mines. They were rather actively engaged in the effort to barricade the German Bight with mine fields as well with deep-laid mines and mines laid in the shallow waters along the German coast to hinder the submarine activities. According to Jellicoe, up to 1 October, 1917—the date when the new type of mine was available—about 21,000 mines were laid in the German Bight, 7,400 near the English coast as a submarine defense; while in the last quarter of 1917 there were further 10,400 mines of the improved type laid out, which were further increased during the year 1918. In the course of that year, 3,000 mines were laid out on the average each month. The entrance of America in the war then exerted a marked influence on the prosecution of the war in this field.

In America, the idea was soon conceived of closing off the northern exit of the North Sea by means of a mine barrage in a manner similar to that used in the English Channel to block the passage there, so that in this way the "submarine pest" might be bottled up. Under pressure of public sentiment, which represented the matter as very simple, this undertaking had to be initiated. With true American optimism, this work was started in 1917; all necessary material was ordered in quantity and numerous factories were built for the prosecution of this task alone, although at the time they did not possess a mine construction, let alone a mine, which was adaptable for use in the great depths of water between the Orkneys and Norway (up to 274 meters). The distance to be covered by this barrage was 250 nautical miles, and in order to effectively block this stretch against the passage of submarines to its greatest depth, about 400,000 mines would have been necessary, the manufacture of which would have been out of the question under the existing overloaded condition of even the American industrial power. The situation was saved by the invention of the antenna mine at this time, which acted to reduce the number of mines necessary for this purpose to about 100,000. This mine functioned when the anchor cable or connecting wires joining the mine case were

touched, but in attaining such extreme sensitivity some of the effectiveness of the mine was sacrificed. For them it was fortunate, therefore, that this new mine was developed in time to permit the scheme to be put into execution, although certain improvements which were decided on after experimental tests were made before they could be given a service test. Thus, in laying out the mine field from 4 per cent to 19 per cent of these mines detonated prematurely. In clearing this mine field after the war, it was found that only 43 per cent of these mines were in their proper place, that 28 per cent were floaters and that some of the mines exploded spontaneously for some unexplained reason. This peculiarity of these mines was sufficiently well known to our submarines in 1918, which sometimes passed through this barrage accompanied by a "concert" of unexplained detonations. It will be clear to the reader that this mine barrage, which only partially blocked the passage between Norway and England, could only be slightly effective with such great losses in mines. The Americans attribute the loss of from six to eight submarines to this mine barrage, while according to our information only two and possibly four were lost in this manner, and even these boats must have been especially unfortunate. In fact, it may be stated that the mine barrage was considerably more dangerous to the enemy mine layers and mine sweepers than it was to our submarines, as indicated by the great losses sustained by those forces, and one can understand the strong aversion of the British Admiralty and the fleet toward this strictly American enterprise. Not to be underestimated, however, is the extraordinary enterprise and the boldness with which the American authorities and personnel undertook and carried through this gigantic program. One can well afford to take off one's hat to those men who were charged with the practical execution of this scheme.

Similar barrages were contemplated by the Americans in other places for the purpose of throttling the submarine activities—the Dardanelles (to supplement the existing barrier), in the Straits of Otranto (to block off the Adriatic), and in three other places in the Mediterranean, including the Straits of Gibraltar. None of these plans were carried out. Some idea of the danger which was estimated from the submarine campaign may be obtained from the fact that these five gigantic projects were under consideration by the allied naval council in Paris on 14 September, 1918, and were approved, in spite of the tremendous cost of the undertaking. During the war the barrier in the Straits of Otranto, which was to serve to cut off the submarines stationed at Pola and Cattaro, was the only one which was in any way effective. But even this effect was not very great, as it did not consist of the wall of mines

projected by the Americans, but only of scattered individual mines mostly in deep water and supervised by numerous drifters, destroyers, and subchasers. (Among these were 36 American subchasers in July, 1918.) The Straits of Otranto are only 40 miles wide, but the depths of the water are so great (over 1,100 meters) that even to-day an effective mine barrier there would be an impossibility. As a result of the ineffectiveness of this barrier, only one submarine was lost at this place (with certainty, the *UB–87*).

In regard to the value of such mine barriers against submarines, this may be estimated as relatively great if the mines are employed in the quantity used during the last year of the war. Thirty-six submarines are definitely known to have been lost on such mine fields, and the true number is probably even greater. Thus the mines proved even more effective than the depth charges (to which are attributed at most 33 submarines), but only in the event that they are used in great quantities, as was done toward the end of the war, and provided this was everywhere possible. This, however, was not the case.

8. ARMING OF MERCHANT SHIPS

This belongs to the offensive antisubmarine measures, since in accordance with the secret orders of the Admiralty these measures took on the character of an attack. The ship captains were instructed not to wait for offensive actions on the part of the submarine, but to attack them as soon as they were sighted. This also occurred in numerous cases, even during the period of our restricted submarine warfare when our submarines were instructed to come to the surface and search a vessel before sinking it. The fact that the English procedure in this matter was contrary to international law is beyond any question, since the submarine is a warship and the merchant ship is not permitted to offer resistance to such search and seizure. Further, the American opposition to such measures, which were only abandoned after Wilson's protests, proved this. The custom of past centuries, in which merchantmen were generally armed, does not alter the situation, since such armament was employed only against pirates and corsairs and not against warships. In spite of this, toward the end of the year 1916, or about six months before the beginning of the unrestricted submarine warfare, about 1,420 English ships were armed; and this for offensive measures. Frequently they had only one gun mounted astern, but this was used in attack as the ship turned away from the submarine and opened on the latter in a retiring engagement. But these vessels preferred to ram—acting under orders—wherever such opportunity offered; thus the *U–33* and also the *U–76* (on

January 27, 1917) experienced such attacks, even before the initiation of the unrestricted submarine warfare. In a number of cases the submarines were damaged by such ramming or escaped only with great difficulty. No cases are known where submarines were sunk by gunfire from a merchantman, but they were frequently prevented by such armament from searching the vessel and were at times damaged by gunfire. Thus the submarines were forced to resort to sinking without warning as a result of this procedure on the part of the enemy. We had only the choice between this and the complete suspension of the submarine campaign.

During the year 1917 there were 2,987 additional merchantmen armed against submarines, this time not with the old guns which happened to be available but with modern guns ordered for this purpose, which corresponded in caliber to the guns mounted on the submarines. In the course of the year thousands of seamen were trained for the service of these guns, and over 4,000 captains and seamen took the training course for submarine combat, while special courses of instruction were held on over 7,000 ships.

In the early part of 1918 about 90 per cent of all merchant ships were armed. The immense amount of material and number of personnel necessary for this purpose shows how much influence was exerted by the submarine warfare on enemy strength, which was thus tied up. In this connection, it should be remembered that only English figures are given.

9. DEFENSIVE ANTISUBMARINE MEASURES

Small measures, such as the protective nets for ships, the smoke boxes, Otter device, etc., can only be mentioned here. The smoke boxes were either placed at the stern of the ship or thrown overboard and were especially employed with convoys where the smoke developed served to screen the ships from the submarines. On 1 April, 1917, about 1,400 ships were thus equipped, while at the end of November, 1917, 4,000 ships had such boxes on board. The Otter device was particularly useful in fending off mines and cutting the anchor cable and were thus effective in discovering new unknown mine fields. In the English Navy, where the device was introduced in 1916, it was supposed to have prevented about 50 mine hits, which is very probably true. In the year 1917 it was introduced in the British merchant marine, and by December about 900 ships were so equipped, although the device was very expensive. In the period following this device was also adopted by other nations, and it is probable that this porpoiselike body which was towed on either side of the ship's bow was largely responsible for the fact that our mine operations in 1918 on the part of the submarines were rendered practically ineffective.

In regard to the other measures which were undertaken by the enemy to keep their shipping on the seas, the convoy system and the replacement shipbuilding must be discussed as a separate matter, even though briefly.

10. THE CONVOY SYSTEM

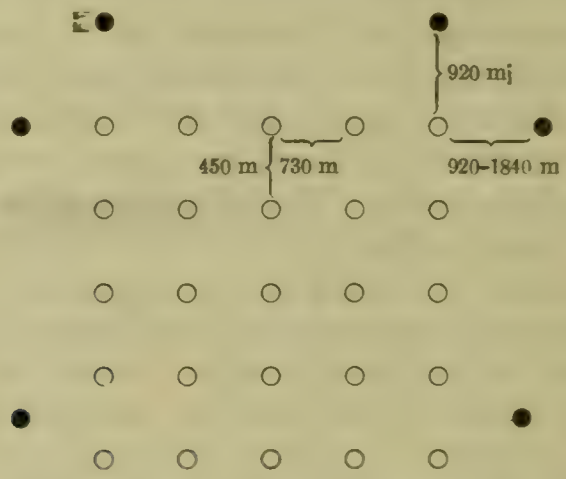
This was conceived as a matter of necessity as a result of the severe loss in tonnage which occurred during the spring of 1917 and made it apparent that some measure would have to be adopted which would lead to a marked improvement in the situation. According to English accounts, the losses in April equaled 831,000 tons, which does not include the losses due to mines and the losses sustained by the fishing fleet. Incidentally, it should be noted this proves the correctness of our calculations.

This convoy system was long known to the English from previous wars and had even been employed before May, 1917 (transport of coal England to France; merchant traffic from Lerwick to Norway and return). But this time, it was necessary to bring all commercial traffic under this system. For this purpose, the necessary convoying vessels were lacking—i. e., older cruisers and auxiliary cruisers for the ocean transports and destroyers and sub-chasers for the zones closer inshore (about 400 miles) where the older cruisers themselves might be subject to attack. Thus the lack of vessels adapted to this service was the principal drawback to the inauguration of this scheme, which was only overcome after the entrance of America in the war had made such craft available in sufficient number. A further difficulty lay in the opposition on the part of the merchant marine itself. As opposed to the older convoy methods, this scheme necessitated the merchantships steaming in formation instead of being scattered in the vicinity of a warship which was kept in sight. This was done so that a vessel might turn out to avoid the track of a torpedo without danger of collision ensuing, and necessitated each ship maintaining its exact position and bearing in the formation. This problem had to be solved for merchantmen of various sizes which were not trained in such maneuvers and whose machinery was not equipped for such purposes; thus their problem was much more difficult than it was for warships of the same class. It appears that Admiral Sims rendered extraordinary service in overcoming the opposition of the ship's captains and in obtaining the necessary convoying vessels from the American Navy for this service, although one reads little of this in English books. Further, there was the aversion of the shipping concerns to convoy methods had to be broken down, since the convoy had to steam at the speed of the slowest vessel, while the assembly of the convoy and

the detachments at various points brought with it loss in time and necessitated detours. On the average, the total loss in time to the shipping as a result of the convoy system amounted to about 30 per cent, which must be charged to the favor of the submarine compaign.

The combined efforts of Admiral Sims and the Admiralty finally resulted in an experimental convoy being tried out from Gibraltar on 20 May, 1917, which reached England without damage and proved that the difficulties stressed by the merchant marine were not insuperable. As early as 21 May, therefore, the convoy system was fundamentally approved by the Admiralty, although the universal application of this principle still lay in the future.

In the beginning the merchant-ship convoys appeared somewhat as follows while in the vicinity of the coast:



In the example shown 25 merchant ships were convoyed by six destroyers only; later more were employed both ahead and on the flanks. The other destroyers were then stationed farther ahead, while between them and the merchant ships was another convoying vessel, on which was the commander of the convoy, who ordered the necessary changes in course in the event of anything suspicious being sighted or on receipt of radio instructions, etc. The convoying destroyers steamed constantly at high speed with zigzag courses, while the merchant ships only resorted to zigzagging in the event of a threatened danger. At first, fishing vessels were employed instead of destroyers, but these were not well adapted to this service on account of their slow speed. The formation of the convoy was arranged so that it was deeper than it was broad in order to reduce the chances for success on the part of the submarine; the number of vessels in the convoy was at times considerably greater than given in this example. On the other hand, there were convoys formed for only two or three ships where the cargo was very valuable. Later a lone ship steamed astern of the convoy, apparently left behind, but in reality these were submarine traps.

It is evident that it was not easy for a submarine to shoot down its victim in the midst of a convoy. If they happened accidentally to be in position ahead of the convoy, they could at times turn to the same course and steaming under water allow themselves to be overtaken by the convoy, whereby, of course, they ran the risk of being run down on showing the periscope. Further, from the midst of the convoy, the torpedo could not be fired in line dead ahead or astern, but had to be offset for an angle run. It was simpler to attack from the flank, whereby the flanking destroyer screen had to be broken through. In order to cause the submarine to believe they had been sighted and thus prevent them from showing their periscope, the merchantmen frequently dropped bombs to intimidate them. During the night an attack from astern in rear of the flanking destroyers offered the best chance for success.

The greatest protection of the enemy commerce and the greatest difficulty for the submarines did not lie in the formation of the convoy as such, but in the administration of the whole system which was gradually evolved from it.

From the summer of 1917 on, the Atlantic convoys, which at first were bound for England and France, and the Gibraltar convoys were entirely controlled and directed by the Admiralty in London, where a convoy section was established, to which belonged the control of all merchant traffic. This was a subdivision of the great department for antisubmarine operations, under the second Lord of the Admiralty, an independent bureau, comprising all the activities in this connection, such as mine sweeping, active antisubmarine offensive operations, and the control of merchant shipping. From the chart room of this convoy section all movements of the convoys were directed by radio until these had reached the vicinity of their destination, when they were then placed under the orders of the commandant of the naval district concerned. These orders, which were issued by radio to the commander of the convoy, were useful in preventing convoys at sea from crossing each other's course during the night, and further, in diverting them from the areas where submarines were known to be operating. This latter fact could be ascertained by cutting in with the radio direction finders on our submarines when they used their radio, which occurred much too frequently at first, but which was later essential in order that they might receive and relay instructions regarding courses which were free of mines. Further, the submarines betrayed their position after every attack, since they could not change the zone of their activities to a great extent.

Naturally, the concentration harbors of the convoy system were guarded by nets and other barriers, and in each of them there was

stationed a naval officer with his staff, who organized and instructed the convoys, etc. In Bergen, for example, this duty was performed by the vice consul, who was a naval officer, a situation which the Norwegian Government condoned in silence. In the year 1917, aside from Bergen, the principal concentration points were Hampton Roads (United States), Sidney (Cape Breton), Halifax (Canada), Sierra Lone and Dakar (Africa), and Gibraltar. These harbors, to which others were added later, took in all seagoing traffic and put out this traffic as convoys every eight or ten days.

In this convoy system, as indicated before, one had to differentiate between the ocean convoys and those convoys in the vicinity of about 300 to 400 miles of the French and English coast—the principal danger zones. The first type consisted of warships of every kind, whereby many American ships were actively employed, while the latter consisted of destroyers or trawlers (as per sketch) and were supplemented later by airships and airplanes in the zones where submarines were actively engaged. The ocean convoy served at first to protect the vessels against the raids of our blockade breakers (auxiliary cruisers) but later served to give the merchantships fundamental training during the cruise until they reached the constantly varied points, where they were given in charge of the coastal convoy.

In the Mediterranean, the convoy system was directed from Malta, under the orders of an English admiral, but did not reach the effectiveness or the strictness of the Atlantic convoys (which were administered with British thoroughness) owing to the friction between the various nationalities (French, Italians, and Japanese etc.). Thus, according to English reports, the losses in the Atlantic due to the convoy system were reduced from one-fourth to one-tenth—i. e., 1½ per cent per month. Although in 1917 there were still a number of merchant ships which were not steaming in convoy, or which had fallen out of a convoy, this condition was considerably improved in 1918. Evidently, though, this system still had one weakness; all the ships in the convoy did not have a common destination, and after the convoy had been disbanded in one of the transfer harbors, these vessels still had to proceed to their destination without adequate convoy protection. Further, the vessels which were later to be grouped into a convoy had first to reach the harbor from which the convoy took departure (Queenstown, Milford Harbor, Liverpool, etc.) and in many instances could not receive protection at all before entering the harbor, as they were not escorted until after the convoy had been assembled.

As early as August, 1917, about 10,000 ships were reported to have been convoyed, while toward the end of the war, from 91 to 92 per cent of all seagoing traffic was supposed to have been brought

under the convoy system. The forces required for the proper execution of this plan may be estimated from the fact that in one single harbor (Gibraltar) under an American admiral there were assigned to this service 314 officers and 4,660 men (American personnel), while the vessels assigned to this base (small cruisers, gunboats, yachts, destroyers, etc.) are reported as having escorted more than 562 convoys in one year.

Although the inauguration of this convoy system resulted in a diminution of submarine activities on the one hand, it still operated to reduce the carrying capacity of the available ship tonnage about one-third and entailed the employment of a tremendous personnel and immense amount of matériel, which in the end meant an important relief for our army. Certainly, the centralization and the complications of the system also operated to cause congestion of shipping in the transfer and assembly harbors. Thus, it happened that on numerous occasions, ships with valuable cargoes were forced to leave the harbors without convoy protection and were attacked and sunk by our submarines. The foreign press was filled with complaints regarding such events, but on the whole they were inclined to place the blame on the bureaucratic methods employed in the control of the shipping rather than the convoy system itself.

This may be the best place to consider the question why so few troop transports were sunk in the Atlantic—and these mostly empty—as compared with the Mediterranean. It need not be emphasized that the navy never guaranteed to prevent this transport of troops; but that was not demanded of them. On the other hand, our submarines would certainly have attacked these valuable ships, had it not been for the fact that this would have hindered them in the performance of their principal mission, which was to sink sufficient cargo vessels to force England to sue for peace. But this mission necessitated the submarine operations being confined to those areas where the greatest prizes were assembled, or in the principal traffic lanes, and could, therefore, not lie in wait for the individual troop transports. This would have been a pure loss of time, since these troop transports, which were the fastest steamers, were always secretly diverted to different routes and were heavily convoyed. Further, these routes were so chosen—at least in the Atlantic—that they lay as far as possible from the submarine zones and could not be reached by our submarines without great loss of time. Thus the troop transports, as distinguished from the usual run of merchant traffic to the English and French ports, were entirely restricted to destinations on the west coast of France between Brest and Bordeaux. These ports weer the farthest removed from our submarine operation zones, particularly after the blocking of the English Channel (end of 1917), while at the same time these routes were almost

devoid of merchant traffic and were a barren zone for commerce warfare. When we consider that for every troop transport there were 100 merchant ships, one can appreciate to what extent the sinkings due to the submarines would have fallen off had we renounced our efforts to sink commercial carriers and concentrated our efforts on the troop transports. Whether or not such a course might have relieved the pressure on our army is still very doubtful, since these transports were the fastest English and former German liners and were strongly convoyed, while further, the southwest coast of France offered few advantages for the conduct of submarine warfare. Our experience had shown that the mission of the submarine should not be too highly specialized if good results were to be obtained, for example, on those occasions where a number of submarines were assigned to a definite station to attack enemy warships, this led to no success even where they were employed in a series of lines. The same situation would have existed in regard to a submarine warfare on the enemy transports; a few would certainly have been sunk, but the results would still have exerted no decisive influence on the outcome of the war. One can compare such special undertakings to a hunter in the field who makes up his mind to shoot one hare from a definite locality; in which case he would probably return with an empty bag, while had he not hunted under these self-imposed restrictions, he might have brought in considerable game. Under the above-mentioned circumstances, it was proper for us to remain with the commerce warfare. This is confirmed by our former enemies and the further course of the war would also have furnished proof of this had not the unexpected collapse brought the war to a close. Without doubt, France was filled to overflowing with the military personnel of the Entente, and the greatest difficulty lay in the provisioning of this extraordinarily large number of men and the supply of all necessary war matériel, against which the submarine campaign was extremely effective, but its influence was just beginning to be felt when the war ended.

In the previous sections, all branches of the military measures against the submarines were thoroughly explained. There was, however, another means of defense, the purpose of which was to equalize the damage done by this submarine commerce warfare. Under this heading belong the regulations restricting supplies, rationing, the simplifications of commercial traffic, the taking over of merchant ships by the State and other similar measures, including the building of ships as replacements for the tonnage sunk.

It would not be possible to go into all the ramifications of these industrial defensive measures without tiring the reader. However,

something must be said regarding the building of replacement ships, since there is a widespread belief that such measures brought our submarine campaign to naught; a belief which is far from the truth. By such ship construction is to be understood primarily the shipbuilding in the United States, since England could not even build the warcraft in her own shipyards which were essential to combat the submarine menace and was forced to rely on America for such building to a great extent. Thus, for example, that country built for England about 550 fast motor boats for subchasers, and later a large number of the larger subchasers. Therefore, there could be no possible opportunity in England to build ships to replace those sunk; while in America, the impetus given the shipbuilding industry was sufficient for that country after the war to practically regain her former supremacy in merchant ships which she ceded to England after the Civil War.

11. BUILDING OF REPLACEMENT SHIPS

If there was ever a measure calculated to offset the effectiveness of the submarine warfare to good effect, that was the building of ships to replace the tonnage lost. For this purpose, however, the shipyards in all countries would have had to expand enormously to be in a position to deliver a new ship for every one sunk; an impossible condition, since the tonnage lost could not be foreseen. Still, one might have expected that when such sinkings began, there would have been an immediate increase in shipbuilding, and this, not alone in the enemy countries where this neglect was largely due to the lack of workmen, but also in the neutral countries (America, for example). Later, however, these efforts were made in the contrary manner—i. e., there began a race in shipbuilding to replace lost tonnage—but these efforts were started too late, speaking generally, so that the end of the war approached without such replacements becoming really effective. It will be instructive to follow the course of these events in greater detail in England and America.

(*a*) *England*

In England, toward the end of 1914, the shipbuilding industry was almost stagnant in spite of the high freight rates, owing to the fact that the Government had requisitioned most of the large ship yards for the construction of war craft; this influence was also carried over to America to some extent, since the English placed some orders there. Not until October, 1915, was the frightened industry again awakened to the situation by the exorbitant freight rates and the increasing loss of tonnage, so that in December, 1915, a few of

the shipyards commenced such building. In March, 1916, the Government began to exert pressure on these shipyards and demanded that the merchant ships under construction be completed, while only a few of the shipyards were reserved for the construction of warships. But at that time there were neither workmen nor matériel available. The workmen had either been drafted into the army or were working in munition factories, from which they could not be released, while the steel necessary for ship construction was required by the munition industry. Thus, they were forced to employ unskilled workmen and even women and children who could only work part time and although in the year 1917 more workmen were employed in the shipbuilding industry than ever before, the output still remained about half of the peace-time deliveries. The deficiency in steel available forced the minister of munitions to ration this metal out to the various industries, which fact, combined with the detrimental operation of the bureaucratic system, resulted in the ruination of some industries. In view of the small productivity of the shipyards, a dictator was named in the office of the shipping controller (Sir Joseph Maclay) who was supported in his efforts to obtain cooperation by the leading shipbuilders and the technical experts (December, 1916). This gentleman not only tried to incite the workmen to greater efforts, but introduced the ship standard—i. e., the construction of a standard type of ships—of which there were seven types, all constructed in the most simplified form possible, and which were taken over by the government for the importation of grain and foodstuffs, while the passenger ships, with their more complicated construction, were no longer to be built. This uniformity of ships of the same type with their simple lines naturally made the construction easier, while the various machinery parts were also standardized in the same manner.

In May, 1917, in order to obviate any conflict between the various industries and interests, the Admiralty, high army command, and the shipping industry were united under Sir Eric Geddes. He then caused to be constructed four large government shipyards, similar to the government munitions factories, of which much was expected in 1918. He was successful toward the end of 1917 in increasing the output of the shipyards to a great extent, but in the first quarter of 1918 the output again fell off to about one-third. Aside from the lack of workmen, this reduction was accounted for by the fact that a tremendous increase in ship repairs was essential and more than 1,000 ships had to be docked on the average every month (ten times as many as formerly). (According to official English sources, on 1 January, 1917, about 100,000 tons of shipping were under repair, while on 8 January, 1918, there were 1,000,000 tons under repair.) This repair work necessitated the

employment of more workmen than new construction. Part of this repair work was caused by the torpedoing of the ships, part by the other effects of the war (collision, stranding, etc.), which accounted for the great increase in repairs necessary. Although Lloyd George, with his well-known optimism, promised to release 20,000 trained shipbuilders from the army, only 2,000 were actually made available, so that no measureable improvement in the situation was apparent. Therefore, England—to her own detriment—was forced to rely on America for this replacement building even in 1918, with whose aid it was possible to equalize the shipping sunk in one month for the first time in April, 1918. However, even with that, the total previous sinkings had not been replaced and not every ship that leaves the ways is ready for service in a short time, while many of such ships built during the war were never ready.

(*b*) *America*

The outbreak of the World War also found the shipbuilding industry in America at a low ebb. But in this country the interests in shipbuilding revived sooner than elsewhere—namely, as early as the spring of 1915—while many orders were placed by England in spite of the higher wage scale prevailing, since the English dockyards were incapable of such building after being requisitioned by the Government. Therefore the prices increased enormously, since the American shipyards did not care to expand, as they were under the impression that this was strictly a war measure and that orders would cease with the end of the war. The earnings were then tremendous, even on the part of the workmen, whose will to work thereupon fell off. This condition soon became worse when competing shipyards which grew up enticed the workmen away with higher wages. There soon occurred a deficiency in material, particularly plates and machines, as the industry of the country was not equipped to furnish supplies for shipbuilding. For this reason orders for ships were carried over from year to year. In short, one soon realized the necessity for the Government to step in and regulate the shipbuilding industry, although there were some individuals cases of extraordinary productivity (such as a 10,000-ton ship being launched three months after laying the keel). In spite of that, America—that is, the Government—permitted matters in this field to take their course for nearly two years without interference, not from lack of ability or understanding but owing to the well-known aversion on the part of the public for Government meddling in private enterprise. The first bill, proposed in 1915, whereby $25,000,000 was authorized the Government for the purchase and building of merchant ships, was defeated. In the next year the same bill was again brought up,

with the appropriation increased to $50,000,000, but could not be passed until 1 September, 1916, because it contained an unpopular provision whereby control of this shipping was placed under the direction of a board. For some strange reason the law was not made effective by the President until after a three months' delay, while the necessary orders to make the board operative (appointment of the board, organization, etc.) were not issued until 22 December, 1916. Thus the Shipping Board could not commence its work until the beginning of 1917.

At first the results achieved by this Government board were only very moderate. Until about August, 1917, the policy of the board was directed by the politicians, as is frequent in America; then followed a series of scientists and theorists who did not appreciate and understand the needs of the shipping industry, until finally practical men (chief engineers of large industrial concerns and bankers) were put in control and remained in office until the close of the war.

In the first period the sale of American ships to foreign countries was forbidden (February, 1917), and it was further ordered that American-built ships might be requisitioned by the State; then the Government started to regulate the price of steel. The board began to let contracts for wooden ships, as the steel shipbuilding industry was already overtaxed. In April, 1917, the Emergency Fleet Corporation, a private enterprise, was founded by the Shipping Board, which was to build the ships under the direction of the board—i. e., to let contracts and purchase foreign vessels. But the private nature of this enterprise did not prevent them from functioning very slowly and bureaucratically. The contracts were frequently changed, and the shipyards were thrown into more or less confusion as a result; while the wooden ships ordered were held up owing to a lack of proper wood. When the chairman (an Army officer and a lawyer) was finally relieved at the end of June, 1917, contracts had been placed for over 600,000 tons of wooden shipping, and 1,500,000 tons of steel ships, but were awarded to shipyards which had more work in sight than could be completed. The newly established shipyards owed their existence to strictly private enterprise.

In the second period (up to the end of 1917) it was decided that the ships under construction could be requisitioned by the Government if they were owned by Americans, but were to be returned at the end of the war. The contracts for further wooden ships were canceled, since it had been discovered in the meantime that there was insufficient wood available in the expected quantity suitable for such construction. The new chairman undertook the construction of three large Government shipyards, although these could not possibly be in full operation until 1919 (the best known being at

Hog Island). The new board then fixed the bonuses and penalties and canceled a great many outstanding contracts. Finally, in November, 1917, when the Shipping Board had still to launch their first ship, public opinion was stirred up, and there followed questions in Congress which were largely instigated by the owners of the private shipyards; these gentlemen also wished to have a say in the matter. A new change in the board was demanded, although it must be granted that the situation had improved to a great extent due to the initiative of the private concerns. In December, 1917, there were 132 dockyards under the control of the board, 58 of which were old yards and 74 new ones, the new yards being principally constructed by money appropriated by the Government. The record construction time for a large steamer (8,800 tons) from the date of laying the keel to launching was 64 working days, although the ship was then still far from completion.

The third period in the history of the Shipping Board, which is characterized by the appointment of a chairman who was an expert in the field, found a lack of workmen and material, since America had now begun to feel the effects of the war. The program was further delayed by the severe winter experienced in 1917–18. The contracts previously placed were found to have been too strict or were otherwise faulty and were to a great extent canceled. No reserve matériel could be stored, and, as for the wooden ships, it was not until 1918 that timber of sufficient length could be obtained to build the keels. New workmen had to be trained to replace the millions who had been drafted into the Army, and schools for this purpose were established. Living quarters for the workmen, which had been neglected in the new yards at first, now had to be constructed. Wages had to be regulated, since otherwise the shipbuilding firms would compete against each other for the labor. Thus by the end of the war the private yards were able to operate to capacity, while during the year 1918 nothing could be expected from the Government yards. It has been estimated that the private concerns should have started their operations at least two years sooner and the Government concerns at least one year earlier. One danger lay in the equalization of wages, which was a disappointment to the skilled workmen. During this period the Shipping Board resorted to the dismissal of faulty contracts, issued subsidies, obtained all possible matériel by means of rewards and penalties, provided for the instruction and subsistence of the workmen, etc., but even these efforts could not in a short time overcome the effects of the war, which resulted in a shortage of both labor and matériel. Thus one was forced to seek comfort in the records made in 1918, which were 51 days for a wooden ship and as low as 27 days, 2 hours, and 50

minutes for a steel ship. The condition of these vessels as regards quality, in view of the rush work, is not reported. These vessels were all of a standard type, as in England; further, effort was made to obtain "unsinkable ships" and orders placed for some built of concrete.

Although in this case, as in many others, one can not say that the Americans were lacking in enterprise and the will for achievement, but one can scarcely say that even these great exertions in that country resulted in a decisive influence on the submarine warfare, as proven by the following figures (even though same are not entirely reliable). These, as well as the data on English ship construction during the war, are taken from American sources, and check with the figures given out by the American Department of Commerce, Bureau of Navigation.

According to these figures, the following seagoing merchant ships were built as shown:

IN ENGLAND	Million tons	IN AMERICA	Million tons
1913	1.93	1913	0.23
1914	1.68	1914	.16
1915	.65	1915	.16
1916	.60	1916	.38
1917	1.16	1917	.82
1918	1.34	1918	2.60

Among these are included 1.2 million tons of American wooden ships of very questionable value. From these figures, it is apparent that in both countries combined the total shipbuilding did not reach the peace-time record until 1917. However, these peace-time figures only represent the tonnage necessary for the normal replacement in time of peace (due to damage, service, etc.). It is shown further that, entirely aside from the submarine sinkings, the tonnage built in 1915 and 1916 was about 3,000,000 tons below the normal peace-time requirements for replacement, a fact which must be taken into consideration in judging the figures for 1918.

The figures showing the construction in America during 1918 are quite imposing, but the influence of this extra tonnage could not begin to be felt until 1919, or after the war. (The statistics of 1922 show that although England had by that time made up her losses in ship tonnage, and that it even then exceeded the figures for 1913, she still controlled only 34.2 per cent of the world shipping, as opposed to 41.5 per cent formerly. In the United States the percentage had risen from 13.7 to 26.5 per cent.) The ship construction in the rest of the world was unimportant as compared to that in America and England, and in 1915 and 1916 sank to a very low point. In 1917 it again reached the peace-time figure of 0.8 million tons, which could not equalize the sinkings.

If any measure served to help the Entente to keep their shipping on the seas, it was certainly not this replacement building, but, rather to a much greater extent, it was due to the measures applied to neutral and other countries. Among these measures are to be noted the confiscation of neutral shipping under construction and the forced seizure of neutral merchantmen which were in English and American harbors. Thus, for example, in March, 1918, about half a million tons of Dutch shipping was confiscated in American harbors. Further, the reconditioning of the former German ships, which had been insufficiently disabled, had furnished very serviceable troop transports for the Americans in 1918, since most of these were former large fast liners. On the whole, the tonnage gained in this manner is shown as follows (September, 1918):

	Tons
German and Austrian ships (118 ships)	730,000
Dutch ships (86 ships)	526,000
From other neutrals (placed at disposal) (215 ships)	953,661
Total (519 ships)	2,209,661

This data from American sources shows that the increase in tonnage made in this manner was more important than the new construction. These figures are only for America and do not include the tonnage obtained from the Japanese for the delivery of steel (up to May, 1918, about 150,000 tons) nor the tonnage acquired by the other Entente countries in a similar manner. Thus, for example, at the end of 1917 the French and British Governments bought up the entire shipping in the Argentine dockyards. Neutral vessels, which were engaged to a large extent in carrying cargoes to England, were brought under the British flag for their protection. This measure alone resulted in the last part of 1917 of an increase of 104 ships, of about 150,000 tons.

Toward the end of the war other measures of coercion were applied to neutral shipping, such as rationing. If they wanted food, coal, raw materials, etc., they were forced to deliver a certain amount of tonnage. In this manner the Entente did a double business; they received not only the desired cargo space but by a careful rationing of the neutral vessels were given the possibility of strengthening the hunger blockade of Germany.

On the whole, there can be no doubt but that these and other measures taken during the war were more effective than the shipbuilding. The influence of these measures was felt even more after the war, and led to the fact that in 1922 the world tonnage had doubled in comparison to 1913, in spite of the great losses during the war.

Chapter V

THE FIGHTING TACTICS OF THE SUBMARINES

One was formerly inclined, in considering the possibilities in a fight between a submarine and a surface vessel, to grant the submarine the superiority. This was, in fact, the situation at the beginning of the war, even though it must be remembered that the submarine was usually forced to seek the enemy in his own waters, and that unknown mine fields and difficulties of navigation would take their toll of the submarines. One of the fundamental weaknesses of the submarine is the fact that it can not always seek the protection of deep water, not only because it must be able to see the surface, but because the machinery installation is such that it must frequently cruise on the surface in order to keep the batteries charged for submerged operations. Under these circumstances (on the surface) the submarine is more vulnerable than the surface craft, since the slightest damage will rob it of its ability to dive and thus deprive it of the one peculiarity which gives it its superiority. In any event, even at the outbreak of the war, when antisubmarine measures scarcely existed, the activities of the submarines were much more dangerous (for themselves) than the layman appreciated, even though in a battle with a surface vessel they possessed a measure of superiority.

This superiority was naturally even more apparent in the case of the merchant ships, which at the beginning of the war were rarely armed. Although in England there were a few armed ships at the outbreak of the war which were partly flying the naval ensign, such as those chartered by the Admiralty, the *Lusitania* and the *Mauretania*, these vessels sometimes flew the merchant flag and were only armed for their "own protection." (Lord Churchill on 6 March 1913.) Since this measure was not adopted until 1913, there were only 39 such armed ships at the outbreak of the war. In this respect, however, no particular offensive was expected from the submarines. More respect was demanded of the submarines by the trawlers which had been formed into an English naval reserve in 1910, and belonged to the organized and trained group which comprised 83 vessels in 1914, and were later greatly increased in number. These vessels, which were originally to be used for mine sweep-

ing and on the service of information—without commissioned or uniformed crews—were under the orders of the English Navy, and soon engaged in offensive operations against the submarines. At first this offensive was limited to ramming.

On the whole, the submarines were enabled to carry on the commerce warfare in accordance with the rules for prizes from the fall of 1914 on for quite a few months. Without running any special danger they were able to stop, search and sink, if justified, any merchant ship after the crew had taken to the boats. These sinkings were then usually caused by a number of bombs which were hung over the side and brought to explosion under water. But, unfortunately, the submarines were unable to take full advantage of these favorable conditions, since the submarine commerce warfare was neither planned nor prepared, but developed first under pressure of the existing conditions, and was inaugurated by the boats on active service.

As soon as England became aware of these activities, there followed the previously-mentioned secret orders for the misuse of neutral flags and the instructions for merchantmen to attack these submarines immediately on sighting. This, then, necessitated other tactics on the part of the submarine, as the former methods were obsolete and had become dangerous. Neither the nationality nor the expected procedure of the vessels sighted could be then determined or counted on in advance. Added to this was the fact that England thereupon began with feverish haste to arm all of these ships.

This circumstance led to the fact that the submarines were empowered to sink any of these vessels without warning as soon as the fact that they were armed had been determined. If the gun or guns could not be distinguished in the distance, the submarine had to take position ahead and remain under water with topedo tubes ready until the vessel approached close enough to make this determination. If guns were seen, the torpedo was fired, while otherwise the procedure in accordance with the rules of prizes obtained. Another means to this end was to open an artillery duel at long range, whereupon it could be determined whether the vessel was armed. But the older submarines (up to the *U–30*) were only equipped with 5-cm. or 8.8-cm. guns, while only the newer boats were fitted out with 10.5-cm. guns and the regular armament of two 10.5-cm. rapid-fire guns was not adopted until the opening of the unrestricted submarine campaign. On the other hand, the merchant ships were not restricted in the caliber of the guns for their armament, in so far as these were available, and carried on the average 12-cm. guns. The disadvantage possessed by the mer-

chantman as a consequence of the greater target area exposed was equalized by the disadvantage of the submarine in having a less stable gun platform, and, therefore, the submarine was not in the better position. There were many instances in which the submarines were able to fight down their opponents, but in numerous cases the submarines were forced to break off the engagement as it was resulting to their disadvantage. Surprise attack by gunfire in the twilight were the best tactics for the submarines, but this condition was seldom obtainable, and the small caliber of the submarine armament was a further hindrance.

The engagement with gunfire was made very dangerous for the submarines by the introduction of the submarine traps, which tried to entice the submarine into making a close approach for better shooting in order to develop their full fire effect. If they succeeded in thus drawing on the submarine, the latter was generally lost. Even the practice of firing a torpedo shot under water from a safe distance could not be counted on as a certain measure, since these vessels were either of very light draft or else were made unsinkable. The only effect of such a torpedo shot was that at times the delicate apparatus on board might be damaged in this manner.

In any event, the arming of merchantmen, the misuse of neutral flags, the offensive operations of the merchantmen against submarines and the submarine traps, all necessitated new tactics on the part of the submarines, much as these were opposed by our own political leaders. Before going on to a consideration of the practice of torpedoing without warning, we shall give a few examples of the tactics employed in connection with the above-mentioned circumstances, although strictly speaking, they belong to a later period of the war.

In August, 1917, the English submarine trap *Dunraven*, apparently a heavy laden merchantman, which, however, was equipped with several concealed guns of medium caliber, two submerged torpedo tubes, and was under command of an active naval officer, was attacked in the Bay of Biscay by gunfire by the *U C 71* (English-American account). In accordance with the prearranged plan, the steamer apparently took flight, defending herself with the stern gun, but taking care that the shots fell short of the submarine, in order to entice the boat to make a closer approach. Since the submarine very cautiously maintained her distance, after a sham battle lasting about half an hour, the steamer pretended to have sustained damage to a boiler as a result of an apparent hit by the submarine. For this purpose a steam escape pipe had been built around the stack. The ship stopped and the "panic group" abandoned ship, taking care that one boat was left hanging by one boat falls and otherwise

exhibiting all the appearance of a panic. But if the concealed gun crews expected the submarine to make a closer approach, they were disappointed, since that boat continued her gunfire at long range and was fortunate enough to obtain three hits near the stern of the steamer, which caused a fire to break out, while the depth charges located aft were brought to explosion. Now the submarine trap was really damaged, and the danger was great, since near the stern of the vessel were not only the concealed guns but the ammunition as well. The fire could not be extinguished if the ship were to continue to play the rôle of an abandoned vessel. The commanding officer held to this firm determination as the submarine then made a closer approach to 400 yards. Now, fire should be opened on the submarine, but the wind then changed and drove the smoke clouds from the burning ship across the submarine and they were forced to wait. This delay saved the submarine, since before the target was clear again the threatened explosion took place and blew up one gun and several men were thrown high in the air. The submarine now knew definitely the nature of the vessel and dived. Since further waiting would have been useless, the commanding officer had the fire extinguished and the wounded men cared for, although he still did not give up the game. A second panic were to leave the ship, leaving, however, two of the guns manned. Then followed the expected torpedoing of the ship, whereby the shock of the explosion tore loose a great many objects about the ship, but no men allowed themselves to be seen. As expected, the submarine again came to the surface, but on a bearing which could not be covered by the guns, near the stern of the trap, from which position it watched the ship slowly sink and opened with gunfire on the stern.

One may certainly wonder at the endurance displayed by the crew of the *Dunraven* in this situation, where they were forced to remain in hiding on the hot decks and did not forget their military training even in the face of the expected explosion. The submarine trap had still one chance for success in the use of their submerged torpedo tube and this opportunity was given them. The submarine then again submerged and cruised close aboard around the wreck under water, carefully watching for signs of life through the periscope. The trap was thereupon enabled to fire both broadside torpedoes as the submarine came on the bearing, but both of them missed. The second torpedo was sighted by the commanding officer of the submarine and all doubts were cleared up. Now, the commanding officer of the trap gave up the game and called help alongside, which up to that time had purposely been kept in the distance. The crew were taken off and the *Dunraven* sank. While it is true that the commanding officer of this trap, who claimed four submarines to his

credit, finally met his master, it must be conceded that the submarine, in spite of all caution, was several times saved by a stroke of luck. The commanding officer of the trap was Gordon Campbell, while the commander of the submarine was Saltzwedel (later killed). The latter described the incident in his war diary in a very much less dramatic manner than his English opponent. It appears from this that the submarine was not aware of having encountered a trap until toward the close of the action, and his previous attitude of caution was simply in accordance with the prescribed procedure for submarine commanders. He sighted the submarine trap at 12 noon (8 August, 1917), and mistook the vessel for a ship of the "Blue Funnel Line," of about 5,000 tons, with six cargo hatches. Since he was too far away for an underwater attack, he opened with gunfire at 3,000 meters and reported three hits, one of which was near the boiler room (which he though to be real), while the third hit really set fire to the stern. The explosion which occurred at 2.50 p. m. was seen, but none of the details, such as men being thrown into the air, who were rescued by the boat which was previously lowered into the water. The distance of 2,000 meters was evidently too great for an exact determination of the details. According to the war diary, the enemy then opened fire at 2.52 p. m. with her 12-cm. guns (differing here from the English account) while the German commander made a quick dive and fired a torpedo (hit in the machinery space). He then observed that about 57 men left the ship and took to a raft and five boats, on which was hoisted the British battle ensign at half mast. He must have now recognized the character of his opponent, although nothing is reported in this connection. He then came to the surface astern of the ship and fired a few more shells into the steamer, after which he steamed around the wreck without seeing any signs of life. In cruising about he then heard a torpedo (the second fired by the trap) which passed close to the periscope, and since the submarine had no more torpedoes on board, the commanding officer decided, under the circumstances, to await further events, as the steamer was in a sinking condition. At 6.10 p. m. two destroyers appeared and one American yacht, whereupon the crew of the steamer went back aboard and extinguished the fire. This steamer was then taken in tow about 9 p. m., but later cast adrift again. The darkness which then set in prevented any further observations. This description shows clearly that the day of the submarine trap had passed (August, 1917), since even though Saltzwedel did not recognize the character of the trap at first, his cautious procedure was the same as though he had knowingly been dealing with such a trap.

As an example of an artillery duel, the fight of the *U–152* (Franz) with an American auxiliary cruiser, *Ticonderoga*, will be described.

The two craft sighted each other at dawn on 30 September, 1918, on the Atlantic; the *U–152* sighting the enemy at a distance of 3,000 meters, on account of the better outlook in spite of the misty weather, while the *Ticonderoga* did not make out the submarine until the latter was within about 200 meters. This circumstance was decisive for the whole course of the battle, since this led to the initial fire superiority of the submarine, while the guns of the *Ticonderoga* were still covered on account of the dampness. The steamer was the former German ship *Camilla Rickmers* (5,130 net tons register), was the property of the American Government and was manned by a uniformed crew, having thus the character of a naval auxiliary. The cargo consisted of munitions and troops. This steamer had been separated from the convoying cruiser during the night and was seeking to regain contact with the escort in the early morning when it ran afoul of the submarine. The first two salvos from the submarine, which was armed with two 15 cm. guns, struck the bridge, chart house, and radio room, the personnel on the bridge were killed while the commanding officer had one leg shot off. The rudder jammed and the ship then started turning in circles. After the first six salvos from the submarine the forward gun on the steamer (7.6 cm.) was put out of action as the crew was killed. In spite of this, the action up to that time was in no way decisive, since only one hit was needed from the after 15.2 cm. gun of the *Ticonderoga* to put the easily damaged submarine out of action. This gun fired to the last, which is a praiseworthy example of the great courage of the American crew. After 35 shells had been fired by the submarine, the boat submerged, since the flash of gunfire was seen past the bow of the steamer and a two-masted craft was sighted, which was supposed to be the convoying ship. This was never fully explained. The *U–152* then attempted to finish the steamer by a torpedo shot, but owing to the fact that the vessel was still steaming in circles and the submarine was difficult to maneuver, the shot could not be fired. Thereupon the submarine again came to the surface, since it was daylight, and taking the more favorable position to leeward—the wind and sea had increased by then—sought to renew the artillery engagement (at 2,500 meters) while the steamer replied with the stern gun. Although the submarine made numerous hits on the *Ticonderoga*, the *U–152* had only one man wounded. In the course of this second engagement, the situation soon became hopeless for the steamer. Although they had succeeded during the pause in the action in extinguishing the fire which had meanwhile broken out amidships, the losses in the personnel had greatly increased and out of the 237 men in the crew only 50 were unwounded. The deck of the unfortunate ship looked like a slaughter house and the

severely wounded commanding officer decided to hoist the white flag and abandon ship.

Owing to the damage to the battle-order transmitters the after gun continued to fire, and this fire was returned by the submarine. Finally a shell from the submarine struck the ship immediately under this after 15.2-cm. gun, which put this gun and the three men serving it out of action, and the submarine was able to cease firing. The survivors meanwhile had started to abandon the sinking ship, but since the boats and falls had been considerably damaged only one boat and one raft could be lowered into the water. As a result of this only 24 men, mostly wounded, out of the 50 who were able to move were saved. At 8.15 a. m. the *Ticonderoga* sank, after a battle lasting, with one interruption, for two and one-half hours. The submarine took the first officer and the chief machinist prisoner, the chief engineer and the second officer had either been killed or drowned. The commanding officer, who lay wounded in the single boat which was lowered, could not be found, and was rescued a few days later with 21 men by the English steamer *Moorish Prince*. The raft containing the other survivors could not be found by the rescuing steamer, and was lost. The submarine could not take these men on board. Thus out of the crew of 237 men only 24 were saved, of which 2 were taken prisoner, but soon released owing to the political upheaval which took place in Germany shortly thereafter.

It is not clear whether or not the steamer made an attempt to ram the submarine at the beginning of the action; in any event such an attempt was not noticed. At the same time the log did not note the torpedo shot which the survivors thought to have seen, so that the action was a pure artillery engagement. This occurred in latitude 43° 5′ N. and longitude 38° 43′ W; the submarine firing 83 shells, 35 in the first phase before diving and 48 in the second. The submarine had managed to obtain a great fire superiority, but had to equalize the disadvantage of its greater vulnerability by means of a surprise attack by gunfire, in which the commanding officer was successful.

A typical example of a pure torpedo engagement, such as was conducted by our submarines particularly after the inauguration of the convoy system and the strong destroyer screens, is given by the sinking of the steamer *Justitia* (32,000 tons) by the *UB–64* (Schrader) and the *U–54* (von Ruckteschell) on 19 and 20 July, 1918, off the coast of Ireland.

Toward 4 p. m. on 19 July, 1918, the *UB–64*, which was then in position near the north channel, sighted to the northwest a convoy standing out, accompanied by a strong escort of destroyers and subchasers, which was headed for the submarine. The convoy com-

prised about 12 steamers, in the center of which, in the most secure position, was a large vessel with three masts and two stacks. According to the silhouette this was very similar to the former German liner *Vaterland*, which had lately been put in service. As a matter of fact this large steamer, which the submarine commander decided to attack with a double shot, was the newly built English steamer *Justitia*. At 4.30 p. m. the submarine was in position to attack, after having passed the screen without being discovered; but instead of being able to fire the bow torpedoes, as intended, was forced to fire from the stern tube, since the convoy had zigzagged in the meantime. At a distance of 350 meters a hit was made on the port side of the steamer near the bridge. There followed, as was to be expected, the usual rain of depth charges from the destroyers and subchasers (35 in all), which, however, did not damage the submarine to any extent. When at 5.20 the submarine came near the surface again for a cautious look around, the steamer lay stopped with considerable list, surrounded by numerous destroyers and blowing off steam. Evidently the hit had been made in the boiler room. The submarine again proceeded to attack and fired two bow torpedoes against the port side of the vessel at 6.15 (range 2,000 meters), which struck the ship near the stern and amidships. The submarine thereupon received 23 more depth charges, which did no damage. When at 7 p. m. the boat risked coming up for another look the steamer was listed considerably and down by the stern and was being towed toward the Irish coast, or to the southward. The persistent submarine commander again placed his boat up ahead of the vessel and at 9.50 fired the torpedo from the stern tube at the port side of the vessel (range 900 meters). The boat thereupon received 11 depth charges and was forced to retire from the scene of action, as the electric batteries were nearly discharged. At 10.30 the submarine saw the steamer still being towed, with increased list and drag astern. Since it was too dark for a submerged attack and too light for a surface attack, the submarine decided to wait for daylight, although no one doubted that the steamer would ultimately sink.

Batteries were recharged and torpedo tubes reloaded. At 5 a. m. the fourth attack was made, although probably owing to the confusion caused by the zigzag courses of the escorting craft, the proper position was not attained, and the torpedo missed. When the boat then came to the surface to clear up the situation, it was found that the depth charges had caused one of the oil bunkers to leak, thus leaving an oil track which would betray the submarine and prevent any further attacks being made against such a strongly convoyed ship. The boat remained in the vicinity and tried with

radio to call other submarines to the scene for attack. The commanding officer had the satisfaction of seeing two further torpedo hits made on the *Justitia* at 11.30 a. m. the following day, which, as it later developed, were made by the *U–54*. These two hits finally finished the steamer, which, however, did not sink until 2.30 p. m. The *U–54* (von Ruckteschell) had sighted the steamer to the northward about 10.40 a. m. on 20 July, without being aware of what had transpired previously. The commanding officer had decided on the attack although he was not in a favorable position. He also mistook the ship for the *Vaterland*. On making a closer approach, it appeared that his position for attack was improving, that the target was steaming very slowly and therefore something must be wrong with the vessel. At a distance of 5,000 meters, the commanding officer sighted through the periscope the outer ring of destroyers and the inner ring of fishing vessels, which encircled the disabled ship. Although the visibility was very good and a heavy swell was running, the commanding officer realized that the attack would be difficult. He still did not hesitate. He took the precaution of taking position on the side of the sun, in order that his presence might not be discovered prematurely. When the *U–54* had reached position up ahead, the *Justitia* changed course 20°, thus putting the submarine on the wrong side. The boat thereupon had to pass around ahead of the screen to take position on the other side. This was carried out at a depth of 15 meters and the receipt was a barrage of about 60 depth charges, which forced the boat to submerge to 50 meters to seek safety.

In spite of this, the commanding officer still determined to carry out the attack and sought to regain position for attack by steaming up on time and then coming up to periscope depth. At 11.32 a. m. he fired his first torpedo at the forward mast and the second at the mainmast, although at the time the shots were fired he observed the convoying vessels steaming directly toward him. On account of the ensuing detonations of the depth charge barrage, only the explosion of the first torpedo was heard after 15 seconds, the rest was an uninterrupted noise of exploding depth charges. The boat retired and rested on the bottom in 59 meters, in order to escape the pursuit, since the battery current was nearly exhausted. Twenty minutes after the attack, the depth-charge barrage ceased. Not until 6 p. m. was the boat able to come to the surface to recharge her batteries. The next morning the *U–54* learned that the steamer had capsized and sunk about three hours after the last attack. Thus in a battle lasting nearly 24 hours the two dwarfs had finally conquered the ocean giant, whereby the persistence of the *UB–64* in this long engagement deserves special recognition. Further, the ship construction of the English deserves special mention, since

it required six torpedoes to sink this large ship. It must be remembered, however, that the submarine torpedoes were not of the best type, since in many cases the older and less effective torpedoes had to be fired along with the others. Further, this sinking makes it evident that the convoy system was not a measure of absolute protection for the merchant ships, since no ship was more strongly escorted than the *Justitia*, and at the time the depth charges had reached the height of their effectiveness. (Such successes against convoys were not exceptional by any means. See, for example, the success of the *U–48* against a convoy in this chapter, in which the latter was almost entirely annihilated.) It must be granted that such an attack, however, requires a high degree of courage and determination on the part of the submarine commander, as well as the ability to make quick decisions, and to fire accurately.

At this place we should note the mine-laying activities of the submarines which patiently carried the mines to the enemy waters where the shipping lanes converged, and laid the mine fields. It is true that the mines were not as effective as the torpedoes, and that the enemy mine-sweeping operations finally were developed to such a point that the success of the mine-laying activities of our submarines suffered considerably. In spite of this, these operations were indispensable, since they necessitated a gigantic defensive project which the enemy was forced to organize and maintain. It is quite wrong to represent these operations as lacking in danger and of little importance on the prosecution of the war. Thus, aside from the first very small mine-laying submarines, we had no submarines which were equipped for mine-laying operations only, but these were also armed with torpedoes which they had to use after the mine laying had been completed. In the second place, the mine-laying submarines had to run the same risk as the others in standing out or in on their mission and were also subjected to the full force of the enemy antisubmarine activities to the same extent as the other types of submarines. It is evident that those localities which offered success for these operations were very strongly patrolled by the enemy. These boats could not simply lay their mine fields in any convenient locality and return to their base, but had to give the exact navigational fix of each mine, while usually these operations had to be carried out in the face of the enemy, as every effort to lay the mine field in the channel after this had been swept, since it was hardly probable that the mine sweepers would sweep the same channel twice in the same day. The older method of laying the mine field in regular rows was soon abandoned by the submarines, since as soon as the mine-sweep division had discovered one or two mines, the position of the whole

field was known. Thus the lines were laid in small separated individual groups, covering the area to be mined. Toward the end of the war the invention of the mine cable-cutting device, the Otter device, considerably reduced the effectiveness of these mine-laying activities since all warships were equipped with this device. Although later many of the merchant ships were also equipped in this manner, it was never carried out to such an extent that mine-sweeping operations could be neglected. As an example of such effective mine-laying operations should be noted that of the *U–73* (Soess), which was the first large mine-laying submarine to go to the Mediterranean (in April, 1916). So far as can be determined, the following ships were lost on the mine fields which were laid by this boat near Malta: The English battleship *Russell*, the patrol vessel *Aegusa*, the mine sweeper *Nasturtium*, and a Russian transport with 600 men. However, such mine-laying operations in the waters near Malta were something new to the English at the time.

The employment of mines, torpedoes, and guns against ships does not comprise the entire list of activities of our submarines; rather, there were a considerable number of military undertakings, which brought with them special problems and were carried out by our submarine commanders because they offered promise of success. These self-selected missions on the part of these officers show the spirit of initiative of our submarine commanders in a brilliant light, since they were mostly dangerous; although it is an open question whether these operations may be classed as proper missions in the submarine campaign. Most of these must be judged from this strict standpoint, although our submarine commerce warfare was conducted for years under impossible conditions or ceased to exist entirely. These activities were the result of the efforts of the submarine commanders to seek some effective employment for the submarines on their own initiative and show in what tragic opposition they stood in regard to the will to war of the Government.

The description of all of these special undertakings would take too much space for this book. In August, 1915, the *U–24* (Schneider) bombarded the benzine factory near Harrington (west coast of England) and caused it to blow up. In May, 1916, the *U–39* (Forstmann) took the harbor docks of Portoserra (Elba) under fire with good success. In December, 1916, the *U–38* (Valentiner) fired on the fortifications at Funchal (Madeira) following the successful sinking of the English submarine tender *Kangaroo*, and the French gunboat *Surprise*, which undertaking made a battle with the Portuguese forts unavoidable. In the year 1917 our submarines several times joined in the engagements raging in Tripoli between the natives and the Italian population. *UC–73*,

bombarded Banghast and Homs. As long as the submarine bases were held in the Adriatic, communication had to be maintained with the Turkish front in North Africa; officers and couriers, as well as munitions, weapons, etc., had to be transported back and forth and several boats were converted for this service. In the same manner, supplies had to be sent to the Dardanelles, before the enemy barricaded the entrance, as Constantinople had to be furnished with fuses, etc. Further (end of 1916) five submarines had to be sent to Varna and the Bulgarian coast on the Black Sea to protect this coast against the Russian warships and to cover from the sea the advance on the Suez Canal (end of 1917), etc. Even though enemy ships might sometimes have been sunk in connection with these special operations, this employment of the submarines still detracted from the principal mission of the submarine commerce warfare. In this connection, a special mission of one of the submarines will be described to which this criticism is not applicable. On 26 April, 1918, while in the Mediterranean, the *UB–48* (Steinbauer) attacked a strong convoy of four ships, of which one was sunk and a second fired on. After following the remainder of the convoy and sinking a third ship, the boat returned on 27 April to the place of the first attack, in order to finish off the damaged vessel, but learned under way that that ship had been towed into Carloforte (Sardinia).

The large steamer *Kingstonian*, which had been torpedoed about 10 days earlier, had also been towed into that port, and the submarine commander was able to recognize both steamers in the harbor, on 28 April. In spite of the fact that Carloforte was a refuge harbor for transports and was strongly guarded by mines and nets, the commanding officer decided to make the attack. The bight is closed by the islands San Pietro (on which is located the town of Carloforte), San Antico, and Sardinia, and has two entrances. In the bay, in addition to the two large vessels, were a number of yachts, schooners, etc. The *Kingstonian*, which was the principal objective for the attack, had lightened ship and had two tugs alongside, all with steam up, causing the commander to believe that the vessel was about to put out to sea. He thereupon left the harbor to await this vessel outside, in deeper water. When these vessels did not appear, and since the *Kingstonian* must still be in the harbor, the submarine commander, having decided on his plan of action, entered the harbor on the surface at dawn of the 29th with a large amount of ammunition in readiness at the gun. At 8.15 he fired a torpedo at the *Kingstonian* toward the side on which the tugs were located. This was set to run at four meters, and passing under the tugs as intended, exploded against the ship's side, causing it to break in two with a large cloud of black smoke.

At the same time the single gun of the submarine opened with rapid fire on the tug. When this vessel, apparently undamaged, disappeared in the smoke, the submarine commander then turned to attack the neighboring vessel, a sailing craft. However, the submarine was soon forced to protect itself from the defense fire, which came from all sides—namely, the forts on the island of Antico—as well as the battery on the mole and the single gun of the damaged steamer *Kingstonian*. This gun on the steamer, which was doing the best shooting, was soon silenced by the gunfire from the submarine, which then turned the gun on the battery on the mole, with shrapnel fire, after the sailing vessel had been set on fire by the shell. Of the two armed tugs which were alongside the steamer, one had been sunk while the other was shrouded in smoke with a considerable list. At this moment a small torpedo boat broke through the line of sailing vessels and headed for the submarine, firing with a small gun mounted forward but chiefly seeking an opportunity for torpedo attack. The *UB–48* then left the harbor, holding off this torpedo boat by means of a defensive fire from her gun, although under fire from the batteries ashore. Just as the submarine was covered by howitzer shell from one of these batteries on San Pietro, deep water was reached and the submarine then submerged. The patrol vessels sent in pursuit soon lost the trail and the submarine had a further opportunity to bombard the signal and radio stations in the vicinity at Sperone. Driven from this locality by a heavily armed patrol vessel working together with an airship, the submarine then left that area for other profitable operations. On this undertaking the submarine sank 25,000 tons of shipping (aside from the *Kingstonian*) and fired all of her torpedoes.

Another special mission on which the submarines were diverted from their principal mission of commerce warfare was the cutting of the ocean cable to which on our side (naval staff) exaggerated importance was attached. This repeated demand that the cable be cut necessitated the loss of much time and the stowing on board of a very cumbersome piece of apparatus, which robbed the submarine of a great deal of its fighting ability as long as it was aboard. On the other hand, the cutting of this cable could only increase the effectiveness of the commerce warfare in so far as it hindered the enemy overseas traffic. Owing to the possibility of relaying the messages by other routes and the great development of the radio, this was highly improbable. It might have been possible in this manner to temporarily interrupt the mercantile business transactions, or even upset the exchange for a few days, but even this only on two conditions, which were difficult of fulfillment. In the first place, a number

of cables would have to be cut at the same time, which was scarcely possible with the small number of submarines available, and in the second place such an interruption could only be of importance if it could be maintained for some time. This was, however, not possible, as the submarines were not technically equipped for the work, and they were further instructed to cut the cable in the shallow water near the coast, where repairs were easily and quickly made. We have only one report of such cable cutting interrupting the trans-Atlantic communications—namely, when the *U–156* (Richard Feldt, who did not return) succeeded in cutting five cables near the coast of North America (radio report).

In connection with these special undertakings is finally to be mentioned the cruise of the *U–53* (Rose) to North America (Newport, R. I.) for the protection of the commerce submarine *Bremen*, which unfortunately did not arrive in America. The cruise (back and forth) lasted from 17 September to 28 October, 1916, or about 42 days, during which the submarine cruised a distance of 7,750 nautical miles without replenishing either fuel or lubricating oil. The boat remained in port only two and one-half hours and returned with 14.5 tons of fuel on board. There was no sickness on board. Near Nantucket Lightship the commanding officer sank seven ships while 16 American destroyers looked on. In July, 1916, the *U–35* (von Arnauld) entered the harbor of Cartagena in order to deliver a letter from the Kaiser to the King of Spain. On 21 April, 1916, the *U–19* (Weisbach) landed the leader of the Irish Nationalists, Sir Roger Casement, on the coast of Ireland in the Tralee Bight, operating in conjunction with the steamer *Aud* (former German steamer *Libau*) under the command of Lieutenant (reserve) Spindler. Although both vessels carried out their mission punctually, the whole project failed, probably owing to betrayal. It is known that the English Government received from some foreign country (ambassador in Washington) a warning which was sent by a member of the Associated Press in Berlin (Times of 26 April). It is highly suspicious that the arrest of Sir Roger Casement was known some 48 hours before it actually occurred. On the English side it has been assumed that the collapsible boat which landed Casement and his supporters on the beach betrayed his presence, and that the police only then began the search which led to his arrest. On 24 April it became known to the naval staff that the project had fallen through, and the recall orders were received by the *U–19* and *U–20*, but not by the steamer *Aud*, which was laden with arms and munitions. After this vessel had safely passed a search it was again seized on 25 April by six English warships and had to be sunk. The

Irish leader was arrested, tried, and executed, while the rebellion was suppressed by force.

The celebrated cruises of the submarine *Deutschland* do not belong to the subject matter covered by this book. After the entrance of America in the war, this boat was converted to a submarine cruiser.

Having described the fighting tactics of the submarines and the manner in which the weapons were employed, we shall give her an example to show that they also knew how to die. The following description is from English sources, based on the immediate deposition of the two survivors and is certainly accurate.

The *U C–26* was returning from a successful cruise near Le Havre and Cherbourg, when it was rammed by a destroyer of the Milne-class during the night of 9–10 May, 1916, about 8 miles northeast of Calais. When the two craft sighted each other for the first time, the distance was so small that the ramming tactics of the destroyer could not be avoided, since the destroyer happened to be in a favorable position for such attack. The submarine started leaking badly and immediately sank to the bottom (46 meters). Depth charges followed, which thereupon extinguished the electric lights. The entire forward part of the boat was filled with water, and thus the attempt to raise the boat by means of compressed air on the tanks failed. In spite of the fact that it was apparent that the boat was lost, there was no panic, but the crew gradually drew together in the conning tower as this was the only part of the boat which for the time being was free of water. The commanding officer, Lieutenant Count Schmettow, made a short speech to the crew in the darkness, and after explaining the situation told them to prepare for death whereupon three cheers broke out for the Kaiser and their country. Hereupon the effort was made to save at least a few of the crew and the compressed air line from the after torpedo tubes was led to the conning tower in the hope that the air pressure would overcome the pressure of the water and permit the upper hatch to be opened. The water ceased to rise in the boat and the crew assembled in the vicinity of the hatch in the expectation that a few might escape to the surface when the hatch was blown open. As a result of this excess pressure in the boat, the hatch was blown open as expected and several men were thereby blown out of the boat. However, none of these men were saved; they were either killed by striking the edge of the hatch or some other metal part in being blown out or else they were killed by the sudden change in the pressure. If they reached the surface they were then probably unconscious and could not be seen in the darkness by the destroyer which was still hovering about in the vicinity on the surface.

The only two men who were saved, a reserve officer P, and a machinist mate A (the names are not available at the time of writing) did not leave the boat until the pressure had dropped off to some extent and partially equalized. On regaining consciousness on the surface of the water, they secured the attention of those on board the destroyer by calling out and were thereupon picked up, escaping in a remarkable manner without any injury to their health. These men then gave the above account, which agreed in every detail, and shows the discipline of the submarine service in a very gratifying light, as it proved that these men not only knew how to fight but how to die.

In another instance, where the end was not so tragic, although all the conditions pointed to just such an ending, "God stretched out his hand to protect them," as the submarine crews have a way of saying. The *U–70* (Wunsche) suffered from a mine explosion near the stern at midnight on 26–27 September, 1917, as the attempt was being made to pass the old English Channel barrier, which was relatively harmless, owing to the low water and the fact that in the darkness the boat had come too close to a float buoy. The result was an unpleasant leak near the stern and the fact that the vertical rudder jammed hard to starboard and the depth-steering rudder was inoperative. The boat could be held to her approximate course with the engines to within 10 to 20 degrees, but diving underway was impossible. On radio request to Brugge, all kinds of help was promised, but the boat had to suffer a great deal before such help could become effective. The next morning (27 September) at 7.45 o'clock, smoke clouds were sighted, which were first thought to come from German vessels, but at the same time the following radio message was intercepted "submarine directly beneath us" (in English) which was probably sent by an airplane. Although the boat was discovered and in the attempt to submerge the boat "hung up" for some time in a half submerged condition (due to damage to diving rudders, etc.) the destroyers did not find the submarine in spite of a three-hour search. Naturally there was "quiet in the boat,"—i. e., all machinery which made any noise was stopped—but it was a remarkable fact that in spite of the leak near the stern the boat had apparently not left an oil track. In any event, there were no depth charges and the only worry was the fact that the water continued to seep in through the leaking stern-tube stuffing box and gradually filled the space under the generators. In three hours at most the main bilge pump would have to be started to keep the water down, and then there would be no possibility of maintaining the condition of silence, leading to the discovery of the boat if the enemy were still in the vicinity. Fortunately, they did not have that long

to wait, as before that time the propeller noises of the surface craft died out, they having either given up the search or been otherwise diverted. At 12.30 p. m. the boat then came to the surface and found nothing in sight. Brugge was informed of the position and course and assistance of tugs requested, while the submarine continued its uncertain course toward the base at 4 knots. At 3.15 p. m. this cruise was again interrupted when two craft were sighted which were at first taken for submarines and called with the recognition signal. These, however, proved to be English P-boats (patrol boats) and the submarine was again forced to submerge and remain quiet, with the exception of the gyro compass installation. This time the submarine received 11 depth charges up to 8 p. m., which, however, did not explode very close aboard and fortunately did no damage. After the propellor noises of these craft had again died away, toward 9 p. m., the boat came to the surface and learned by radio that it was to stand in to Brugge. The course was given and the boat informed that a group of torpedo boats would be sent out to meet her (10.40 p. m.). Since these instructions could not be carried out on account of the uncertainty of the course, assistance was again requested of Brugge, but the submarine's position was doubtful. As might have been expected, the submarine failed to make contact with these torpedo boats and was forced to continue its voyage alone.

Soon five enemy destroyers were reported near Brugge, which were sighted at 3.25 a. m., and the submarine was again forced to the bottom, since it could not maneuver to avoid them. After the *U–70* had again come to the surface at 4.40 a. m., it was forced to go to the bottom twice more on sighting surface craft, since their nationality could not be determined, and the boat could not risk breaking the surface for an observation. Evidently these were German craft, since at 8.48, when the submarine again came to the surface, a message was received giving the course through the mine fields and stating further that the German escort had returned to port. However, aircraft assistance was promised. At 9.30 a. m. (28 September) the boat finally established contact with a German airplane, which promised to bring destroyer assistance to the locality, and all danger then appeared to be past. But the greatest danger was still to be encountered. Shortly after (9.50) six English destroyers were sighted to starboard and four German destroyers to port, the latter apparently turning away from the enemy craft. At this moment an enemy airplane suddenly glided from the direction of the sun (unobserved, therefore, by the *U–70*), and coming close aboard dropped three heavy bombs, of which one exploded close to the conning tower. The boat submerged quickly and rested on the bottom until noon, since propeller noises were still heard, but on coming to the surface

again the enemy aircraft again forced the boat under water. The submarine did not dare come to the surface again until 4 p. m., although the situation meanwhile had become critical. The heavy explosion of the airplane bomb had broken a number of the battery cells, and the acid had leaked out into the boat, while the battery naturally discharged; and further, the compressed-air supply was exhausted. The boat had to report to Brugge that it was completely disabled and would have to await assistance in that position while resting on the bottom. Since the position of the boat had then been cut in by the radio station at Brugge, the attempt at rescue seemed more promising than ever before. When the boat came to the surface again at about 7 p. m., the half flotilla VI (Lieutenant Claussen) was in sight, and since the submarine could not be towed it was taken alongside and brought into the harbor of Brugge at 11.30 a. m. The torpedo-boat flotilla had never abandoned the search, although they had several times been engaged with superior enemy forces and had been cut off by them from their base. Owing to the uncertain position reported by the boat and the fact that the submarine had had to remain on the bottom for considerable periods to escape enemy craft, this destroyer escort had been unable to find the boat during the nights of September 27 and 28. Further, the unavoidable radio messages sent out by the submarine resulted in betraying the boat to the enemy, and thus rendering the salvage more difficult. This description shows the difficulties which may be encountered by a submarine, even in the immediate vicinity of its own base and supporting forces, if it is deprived of its most important characteristic—its ability to dive.

These few examples of the submarine activities will have to suffice for the space permitted in this book. They could be very greatly increased, and would make an interesting book in themselves.

Chapter VI

MATÉRIEL AND PERSONNEL

1. NUMBER OF SUBMARINES AND SUBMARINE CONSTRUCTION

The number of submarines in active service is given in the table which shows the number actually in service at the front in the various theaters of war on the 10th of each month. These figures do not include the boats employed as training boats, nor those which were undergoing trials—i. e., they give only the number of active boats employed in operations against the enemy. This shows that we started the war with 20 boats and that the unrestricted submarine campaign was started with 111 boats (February, 1917). They show, further, that the greatest number of boats ever available at the front was 140 in October, 1917, from which time there was a gradual reduction in the number up to September, 1918, to 128. (If these figures appear to differ slightly from those given in the previous chapters, it is due to the fact that in those places we have used the average figures for the month while the tables give the exact figure for the 10th of the month. The table further shows the disposition of the boats in the various theaters of war, where the number of boats in service around England (North Sea and Flanders) is particularly interesting. Thus, the number of boats which were ready for service at the time of the unrestricted submarine warfare was equal to 49 plus 33 equals 82, which number was increased the next month to 90 and remained at this figure until the spring of 1918; over 80 boats were still available in September, 1918. In general, the figure 90 may be taken as holding for this important theater of war throughout the entire period of the unrestricted submarine campaign.

It has been much disputed whether the number of submarines was adequate for the prosecution of the war against England and France, considering the fact that one-third of the boats must be laid up for repairs, one-third on the trip to and from the operations zones, leaving only one-third at the immediate front for service. This calculation is rather too low for the year 1917 (up to the date of blocking the English Channel) in so far as pertains to the time consumed in going and returning to the base, and this should be more exactly analyzed. On the other hand, this figure is rather

high for the submarine cruisers which had long trips to make and required especially long overhaul periods. The same is true of the Mediterranean flotillas, which were based in the Adriatic, where the docking facilities which existed in the home bases and in Flanders were lacking.

Thus without danger of exaggeration we may say that in the North Sea and Flanders there were constantly 30 boats in active service near the enemy, although it is true that this figure might be considered slightly high in view of the fact that the small boats (*B–I* and *B–II*) as well as the small mine-laying boats were not adapted for this distant service or did not find sufficient activity in those zones (North Sea). These boats, therefore, sought employment in the English Channel or on the east coast of England. Thus for operations on the west coasts of our neighboring enemies only 70 submarines may be considered as available on 10 November, 1917, while only 60 could be considered available on 10 March, 1918. In order to be on the safe side one may assume, therefore, that only 20 boats were constantly in active service at the front in this most important theater of war, taking into consideration thereby that some of these boats were at times employed on special service (near Norway, Arctic Ocean, etc.). This number appears to be somewhat small in consideration of the area to be covered (which extended from latitude 47 to 57)—in all, about 1,100 nautical miles long when the channel is counted in—but is still adequate, if we remember that only the points where the traffic converged were occupied. In general, the principal points were as follows: The North Channel (northern exit from the Irish Sea), St. Georges Channel (southern entrance), the Irish Sea (Liverpool and Dublin), the western exit from the English Channel (the Scilly Islands to Quessant), the south coast of Ireland (Queenstown), and the coast of the channel (from Falmouth to Portsmouth and from Brest to Le Havre).

Thus the whole area was reduced to about 12 narrow operations zones, which were occupied by two submarines each. It has been previously shown that the number of submarines available was adequate for the submarine commerce warfare, even though the number was smaller than might have been desired, or to conduct operations against troop transports. The latter mission could not be taken over by the submarines for reasons already given.

Could we and should we have built enough submarines so that we might have been able to undertake to fulfill this mission as well? That we could have built these additional boats and even manned them with trained personnel there is no question after the representatives of the large industrial concerns in conference with the Navy Department (14 June, 1917) stated that the number could

have been doubled by a proper distribution of the contracts. Without doubt also the crews necessary could have been provided by the time the boats were ready, in view of the long construction periods, but at the expense of the other branches of the service, in particular the High Seas Fleet. Further, aside from the question of the American troop transport—which no one could have foreseen—it would have been wise to have provided more submarines for the commerce warfare than we actually needed. This important question can not be dismissed with the reproach directed against the Navy Department, and the navy in general, for neglecting the construction of submarines. Such an accusation can only be sustained during that period when there was a possibility of beginning the submarine warfare—i. e., from the end of 1916 on. No naval administration would have been able to start quantity production of submarines during that period when the army, political leaders, and Parliament were uniformly opposed to the unrestricted submarine warfare. That would have been a special policy which was impossible under our Government as it was established and the responsible secretary—either Tirpitz or Capelle—would have been removed from office very promptly.

The situation appears in a different light, however, when we put the question in another manner: (1) During the decisive period of the restricted submarine warfare, was everything possible done for the construction of submarines? (2) Did we start the building of submarines under high pressure from the end of 1916 on? Both questions can not be simply answered in the affirmative.

In regard to the first question, covering the period from the outbreak of the war up to the end of 1916, it should be pointed out that, as correctly expressed in a Guild Hall speech by Lloyd George in the spring of 1917, for a time we ourselves did not realize what a terrible weapon we possessed in the submarine. Our methods during this period prove this point very thoroughly. The submarine commerce warfare had to evolve gradually from the experience of the boats on active service, and hindered by the military and diplomatic restrictions its growth was slow. Thus the officials responsible for the construction of submarines in the first two years of the war can not be condemned if they did not regard the building of such boats as their principal mission. In regard to Grand Admiral von Tirpitz, it must be remembered that he, as secretary for the navy, was chiefly concerned with the preparation of the fleet for battle and the completion of the battleships under construction, and rightly so, since to this experienced officer it was clear that not only the prestige and spirit of the navy depended on an early engagement with the British Fleet but that there was a great possibility for

success if this battle could be fought as soon as possible. From the fall of 1915 on the strength relations of the two fleets would then change rapidly to our disadvantage. At the same time, more might have been done in the bureaus concerned in the navy department than was actually done to expedite the construction of submarines. A glance at the table showing the dates of placing contracts for submarines shows how irregularly such orders were placed during that period, and how inadequate, in many cases, was the number. Another noticeable fact is that from 15 September, 1915, to 5 May, 1916—i. e., for almost eight months—no contracts were let for large submarines, while in the case of the UB boats, the interruption was even longer (10 months). During this time there were no submarine torpedo boats ordered but only submarine mine layers.

It is further noticeable that during the first year of the war there was no regular construction program, but the orders were influenced by the demands of the service and the submarine inspection. This irregularity in awarding contracts for submarine construction further had the disadvantage of failure to make full use of the capacity of the shipyards for building, since at times they complained of lack of work and at other times they were overcrowded and delayed. The building of a series of boats of a type with regular intervals between dates of letting contracts, would have been the proper procedure, even though the development of new types might not permit complete uniformity in the intervals between awards. Also, we suffered under self-imposed restrictions in this connection, since the employment of new shipyards on such work was opposed and one thought it was necessary to remain with the older well-known concerns. These consisted, aside from the Government dockyards at Danzig and the Germania Works at Kiel of the Weser at Bremen, the Vulcan at Hamburg, and Blohm & Voss at Hamburg. Although these last three yards were drawn into this work during the war, one did not wish to go further to outside concerns, but contented himself with the output available from these five shipyards. The requests of the Schichau (Elbing) and the Reihersteig Works (Hamburg) to be allowed to participate in the building of submarines was refused. The situation in regard to the construction of motors was similar, although for better reasons. Thus, the old well-known concern of M. A. N. (Machinenfabrik Aufsburg Nurenburg) had for a long time a monopoly on the 4-cycle engines, while the Germania Works built the two-cycle engines, but later went over to the construction of four-cycle engines. This motor, the M. A. N. four-cycle, proved very satisfactory and held its place throughout the whole war. Toward the end of 1916 the following concerns were also engaged in the manufacture of this type of

motor: Korting, Daimler, Benz, Vulcan, and Blohm & Voss. The firms of Korting, Daimler, and Benz were engaged from the start in the manufacture of the motors for the smaller submarines (B and C boats). This excellent construction of motors, which represented the pinnacle of achievement in the German industry, and to which must be chiefly attributed the means for the submarine's success, was far in advance of anything developed in other countries along these lines.

The first adequate award of submarine contracts was made in May, 1916 (58 boats). This large order had been made necessary by the long interruption in the orders placed for submarine torpedo boats (since the fall of 1915). In the meanwhile the conditions were more favorable for the initiation of the submarine warfare and in the Navy Department it began to appear as though some basis of understanding would be reached. Thus, in May, 1916, a large number of submarine-building contracts were placed, but, as shown by the subsequent course of events, by that time it was too late, since many of the boats ordered then were never to see active service, and quite a few were not even delivered. Admiral Tirpitz had resigned on 17 March, 1916, and had been succeeded by Admiral von Capelle. The responsible official charged with the submarine construction in the Navy Department was the chief of yards and docks (at the time Vice Admiral Kraft). As a result, the orders which were placed at this time and the efforts made to increase the output of submarines are of less importance in the prosecution of the war than they are in showing what might have been accomplished along these lines had the activities of the navy not been continually hindered and restricted by the political leaders. In so far as the prosecution of the war was concerned, most of these efforts came to late to be effective. In conjunction with this, the blame must be placed on the lack of orders during the year 1916, which in turn was due to the labor situation and could not be solved as long as the unrestricted submarine warfare was not authorized. Aside from the question of new construction the labor situation in regard to repairs was beginning to make itself felt. This was particularly true in the Mediterranean, where the conditions were more and more apparent the older the boats which were sent from the home ports. In September, 1918, the commander submarines flotillas in that zone, Commodore Pullen, had to report that two of his larger submarines had been undergoing overhaul for one year and that five other submarines were out of service owing to the great length of time necessary for repairs. These faulty conditions, aside from the lack of skilled labor, must be attributed to the neglect to fit out these bases and the late date at which construction

was undertaken. The Austrian Government did not support the work at the repair station at Pnavica (Bay of Cattaro) and adequate construction work was not undertaken until instigated by the submarine bureau, and not fully supported until after the appointment of Admiral Horthy. Therefore, the Pnavica docks were just in condition for handling the work of repair and overhaul when the base had to be abandoned. That it would have been easily possible to avoid these detrimental conditions resulting from the lack of docking facilities in the Mediterranean bases is proven by the situation in Brugge, where such repair works were built up from nothing. However, the latter base was under the command of two energetic officers, Admiral von Schroader and Commander Bartenbach, while the whole project was instigated by Grand Admiral von Tirpitz, an exacting commander.

As a matter of fact, some time elapsed before we placed any large orders for new submarines and even more time passed before an adequate program was worked out, even after the unrestricted submarine warfare had been finally decided on (9 January, 1917). The tendency was to retain the older method of ordering only the submarines which were apparently necessary as a result of the losses sustained, the demands from the front, and in accordance with the labor situation, etc. Not until the end of June, 1917, were large scale orders placed (95 boats). The reasons for this delay may be judged from the result of a conference held at the instigation of the commander in chief of the fleet, between the officials of the Navy Department, and the representatives of the shipping and motor industries (June, 1917). In this conference, the Navy Department defended its position by stating that crews could not be made available for additional submarines, that it was necessary to build more mine sweepers, that to meet the new conditions of war, new types of submarines were constantly being demanded, that the development of these new types must necessarily delay the construction and the award of contracts, etc. All of these were reasons which were only valid to a small extent, since it developed that the industrialists charged the Navy Department with continuing to place orders without a comprehensive building program and without seeking the cooperation of the industrial concerns in question. They claimed, further, that had such cooperation been sought, the shipyards and the motor industry could have doubled their output and constructed at least 200 more boats. Further, the industrialists were able to bring proof of this fact and their efforts later on showed the correctness of this accusation. However, the blame for this whole condition rests less with the Navy Department than the political leaders. At all events, the bureau of yards

and docks started out with the perverse idea of considering what was to be done with all these submarines if peace were suddenly made. This idea was founded on the assumption that the submarine campaign, even at that late date, would bring the war to an early end.

When the submarine bureau was finally organized as a result of the demands of the service and under pressure from the commander in chief of the fleet (5 December, 1917), it was possible for that bureau to place orders for 120 boats during that same month and 220 additional boats in the next six months. New shipyards were drawn into this work, and the period of construction was so arranged that every month in the future would bring a definite increase in submarines over and above the losses. One must realize that the submarine bureau, under Vice Admiral Ritter von Mann, being freed from the budget restrictions of the Navy Department, was able to correctly grasp the problem and deal with the whole situation. One difficulty, however, could not be overcome by the bureau, and that was the labor problem. This attempt failed repeatedly, due to the opposition of the high command of the army; a situation similar to that which obtained in England in connection with the construction of merchant ships. Our general staff took the position in June, 1918, that the needs of the army in the replacement draft should take precedence over all other services, and that if the navy needed skilled labor they should train the men themselves. This was not a logical position, since after the general staff had supported the principle of the submarine campaign that should have assisted the execution of this plan, as practically all skilled labor was under the control of the army. One must wonder how in June, 1918, they could still hold to the conviction that the army was the decisive factor in the war; but at this date we can not agree. This shows the bitter necessity for the unity of command which is essential to a nonpartisan decision in regard to such important questions.

The inadequate cooperation between army and navy, which showed this time in unmitigated form, resulted in the removal of the newly established naval high command to general headquarters (September, 1918). This step was followed by immediate results, since at the time the large-scale building program was to become effective (Scheer program) the general staff offered to make the necessary number of workmen available for the execution of this program, although the number essential for this purpose had now increased to 69,000. Of this number, one-fourth were to have been made available for immediate employment.

The Scheer program was authorized after a conference between the high officials of the army, navy, and the industry on 1 October,

1918, in which Admiral Ritter von Mann represented the Navy Department instead of Admiral von Capelle. This program contemplated the construction of 376 new submarines, including those for which orders had already been placed, and was to be undertaken by 11 dockyards. The deliveries were to be so graduated that there would be a constant increase in the number of submarines available from month to month. While an increase of only 13 boats could be assured for Otober, 1918, this number was to have been increased to 22 in April, 1919, 33 in August, 1919, and 37 in December, 1919, when that program was to be finished. For the year 1920 there would then have been 33 submarines delivered every month. The requirements for the carrying out of this program were authorized by the general staff.

This comprehensive building program, which was undertaken on the eve of the overthrow of the Government, naturally came too late to be effective. It proves, however, to what extent our industry would have been capable of meeting the requirements even in the fifth year of the war; and is further proof of what might have been accomplished in connection with the supply of means for the proper prosecution of the submarine warfare had we promptly realized these conditions under able and energetic leadership.

The above description would not be complete without mention of the services rendered by the technically trained officials of the navy who were charged with the responsibility of fitting out and preparation of the submarines and their weapons. These were the officials of the submarine inspection (trial board, etc.) and the torpedo inspection. The submarine inspection was charged with the duty of supervising the construction of the submarines, training the crews, and conducting the trials. This was a considerable problem, particularly as this submarine inspection board was not an independent body, but was under the control of the Navy Department. In spite of all difficulties, the submarine inspection was able to meet all the demands of the service and to see that the submarines were suitably developed and even to improvise improvements where same were necessary. If some of the submarine types which came into service were not entirely satisfactory, this may be attributed to the constantly changing demands of the service and the feverish haste with which such alterations were undertaken. Among those who rendered distinguished service in this connection should be mentioned Naval Constructors Berling, Werner (Dr. of Eng.) and Behrendt. Among the naval officers who served with distinction on the submarine inspection board are Commanders Blum and Gayer.

The torpedo inspection board under Rear Admiral Hering in Friedrichsort had to labor under similar difficulties. When the

submarines were employed for commerce warfare, the torpedo works had to be expanded, new construction methods developed, substitute material made available, etc. In spite of all the difficulties resulting from the war this problem was solved satisfactorily in a brilliant manner. The number of workmen was increased from 2,500 to 7,000 and the deliveries per month from 25 to 375. In addition the services rendered by the torpedo engineers Giessen and Gallish deserve special metion although there were many others. Further, a number of private concerns were also drawn into this work and rendered valuable service including such firms as Krupp, Schwarzkopff, Adlerwerke, and Whitehead (Austria).

2. PERSONNEL AND TRAINING

An English naval officer (Klaxton, The Story of Our Submarines) represents the German submarine crews as "machines, without any particular interest in the events which were transpiring." Nothing could be farther from the truth than this unjust judgment, which is to be attributed to the fact that he had seen and interviewed German prisoners from submarines who had received the strictest orders to appear stupid and not to answer questions, but to say that they knew nothing and that the officers only could be informed on those subjects. This order was given as a result of the war experienced, which proved that when enlisted men were questioned they were subject to a clever cross-examination, which forced them to reveal secrets they would not otherwise have disclosed. This procedure is defeated if a man follows instructions and is judged to be stupid.

As a matter of fact, the conditions were quite different. The crews all took extraordinary interest in their service and were always anxious to be informed regarding the events which were taking place, and their curiosity was always satisfied by the commanding officer where opportunity offered. But the English have always tried to pretend that our naval personnel, as a result of the three years' compulsory service, were simply soldiers put in naval uniform who took no interest in naval matters and who did not understand the life at sea. This is another incorrect statement, although it may be true that the method of employing mercenaries, drawn from the seagoing trades, may yield better results even though it is more expensive.

Our submarine personnel consisted to a great extent of men who were seamen by trade. All petty officers were such men, while even the oilers and seamen for this service were selected from that class of men where possible. In the first few years of the war this service was also voluntary and only toward the last were such crews

selected from the draft. However, intensive training went far to equalize such initial disadvantages.

The spirit of the submarine service was excellent throughout. It was considered a distinction and an honor to serve in the submarine service, and there is no case on record where the submarine crews failed in the performance of duty, even under the most trying circumstances.

The English have long since admitted that their news reports concerning the voluntary surrender or capitulation of submarine crews and desertion from this service were lies propagated to quiet public opinion, which was terrorized as a result of the submarine campaign. On the other hand, a number of bold escapes from prison camps and internment camps on the part of the submarine crews are known, where the men wanted to return to their service, some of which weer successful. Among these was the escape of the crew of the *UB–49* from the Spanish internment under the commanding officer, Von Mellenthin (17 October, 1917).

The relations between the officers and men were particularly good in this branch of the service, not alone because they were "in the same boat and ate from the same pot" (one of the first revolutionary requirements), but because it was based on mutual good will and respect. On a small craft, where each man on board is in constant association with his superior officers and each is responsible for a certain part in the operation of the boat, such relations are more easily established than aboard a large vessel. This was especially apparent during the revolution, where the larger battleship crews participated in the "glorious" revolution, while the crews of the smaller vessels, and in particular, the submarines, would not join this movement. The torpedo boats and submarines under the leadership of their force commanders (Commodores Heinrich and Michelsen) were instrumental in suppressing the first outbreak of the mutiny (the wire-pulling leaders sat in Berlin), and although this was only temporarily effective, that is to be attributed to the fact that it was based on an uprising among the entire populace which had been preparing since 1914 and which was only waiting to be initiated by the army and navy. The submarines held out to the end against these revolutionaries, and many of the crews by unanimous consent preferred to be blown up on the mine fields defending their country than be untrue to their oath and their own convictions. Only when they were overwhelmed by the rising red tide and could find no other support, either among the citizens or their former comrades in arms in the other branches of the service, did these men, under the direction of their old officers, haul down the battle flag for the last time and go off to their homes. Such was the spirit of the submarine service.

Naturally, there were a few exceptons, but even these were pure idealists and enthusiasts who fell on the neck of the author (among others) in the beautiful hope of becoming a "brother" for all time, etc. Poor, good, deluded, and misled men, who were defrauded by this red propaganda.

The above refers particularly to the submarines themselves, in whose ranks in a few places (such as on the tenders, shore stations, etc.) there were a few who acted differently but there was no rioting. On the contrary, thus, for example, on my flagship (the old cruiser *Hamburg*) under the command of Commander Hinsch, the crew opposed all efforts of the revolutionaries to make them hoist the red flag for 10 days, and finally when the mutinous garrison at Wilhelmshaven threatened to resort to force these rascals hoisted the red pennant "Z" (meaning attack the enemy) instead of the square red flag of the revolution. The Soldiers and Workmen's Council, which was then having difficulty trying to obtain clothing and food, etc., for their comrades, had to be content with this result.

But what has that to do with the submarine warfare? It shows the spirit which prevailed in that service and also proves the fact that this was a selected body of men in every respect. At the outbreak of the war the entire personnel, including the shore stations, tenders, etc., comprised only 1,400 men in this service. Toward the end of the war this number had been increased to 11,917 on 1 September, 1918, including the shore stations, tenders, staff, etc.; but to obtain an idea of the full requirements in personnel for this service, we must add to this the 5,924 men who were killed or missing, thus bringing up the number to 17,841. On the boats themselves at the outbreak of the war were only 747, while in September, 1918, there were 5,467. The last number, when compared to the losses, shows the percentage of loss to be 52 per cent. The total number of men employed in this service during the war, including those on the tenders, in shore stations and who were only employed for a short time, can not be exactly determined at this time. This number is estimated at 13,000 (approximately) and this assumption would also reduce the percentage of loss in this service when considered as a whole.

This number of 18,000 men who served in this branch of the service during the war, or the 11,000 men in this service who were actively engaged with the enemy, seems very small in comparison with the large numbers of men employed elsewhere in the World War. In this respect, this relatively small group were more important than a large army, since they not only forced the issue against a superiority of two or three to one, but held in check a number of men necessary for the counter offensive equal to a hundred or thousand times their own number.

The training of these men was a difficult matter, since immediately after the outbreak of the war the submarine training school was abolished entirely. This, therefore, had to be reestablished during the war when time and material were precious and an extensive training apparatus had to be developed. The difficulties encountered in this connection showed clearly the necessity of a separate submarine command or an independent bureau for this service.

At first the submarine training school was reopened and the training begun with the matériel at hand from the peace-time school. The courses for the officers (commanding officers and chief engineers) were three months' duration; the watch officers were also required to be torpedo specialists. The training of the noncommissioned personnel had been previously diverted from this school and was taken over by the submarine division (later the submarine division branch section). Here the courses for the submarine machinists, helmsmen, etc., lasted three months. Neither the training submarines nor the other matériel necessary for the school could be obtained in sufficient quantity to keep pace with the growing personnel assigned to the course, and all efforts on the part of the officials interested (submarine inspection board; the commandant of the training school) to remedy these deficiencies failed as a result of lack of money appropriated and matériel. The Navy Department, partly influenced in its actions by the attitude of the politicians and partly by its own organization, hesitated to supply the necessary matériel since, as in peace time, the department concerned itself with every detail and frequently much-needed apparatus requested by the submarine inspection was disapproved on the ground "of its high cost." Conditions improved in this respect to some extent after the declaration of the unrestricted submarine warfare, but even then the commander in chief of the fleet was often required to furnish assistance to the school in order that they could carry on the work. With the establishment of the submarine bureau in Berlin, the necessary interest was taken by the Navy Department, but as even the bureau was not omnipotent much valuable time was lost, and it may be stated that up to the close of the war the school was never properly equipped. This chronic lack of matériel had to be equalized by greater personal efforts on the part of the force of instructors, and it must be admitted that these officers succeeded in this difficult task, with the result that the crews made ready for active service were always well trained. Accidents and damage to the boats sometimes resulted from faulty operation even in the later part of the war, but these were relatively unimportant compared to the losses sustained in the beginning due to such errors. In particular, during the course of the war, the

training school under the command of Commander Eschenburg at Eckernforde became a model school. This is all the more remarkable, since the type of submarine was constantly changing, the enemy counter offensive better organized and developed, the improvements on the submarines themselves were made frequently, necessitating a change in the methods of instruction and very complicated courses of study for the personnel. In the course of the development it was necessary to train the new engineers, the midshipmen (for small boats), and radio specialists, as well as to give special courses in hydraulics, etc.

While formerly one could count on the personnel assigned to the school having already had some training in naval matters, it soon became necessary to provide for special courses for the personnel from the naval reserve and from the large ships, and finally, these training schools had to start the training of recruits. The development of the convoy system on the part of the enemy made it essential to inaugurate additional courses of training to assure accurate torpedo fire, and the personnel had to receive practice by operations against protected coal barges, etc. (representing convoys).

Thus, for example, in September, 1918, in addition to the regular submarine training boats (20) assigned to the school, there were other craft employed, which were obtained from the submarine trial board, these being target ship *Stettin*, mother ship *Meteor*, 1 diving tug, 2 transport steamers, 12 steamers, and 3 tenders (old torpedo boats) for use as target vessels in convoy, 4 fishing vessels for the same purpose, and 17 older torpedo boats; in all, about 80 vessels. At the same time, there were the following vessels assigned for the training of the lower ratings—4 ships for the quarters for the men, 6 tenders, and 10 training submarines, so that all in all there were over 100 such vessels employed for training purposes. To this was added the submarine salvage group (*Cyklop*, *Vulcan*, and 1 tender) and a submarine patrol group (four fishing vessels). All these detachments, including the submarine trial board, had a combined personnel of 6,066—i. e., or more than the total number of men actively employed in the submarines and their staffs at the same time (1 September, 1918). That gives some idea of the extent of the training.

The submarine training schools held nine three-month courses between 1 April, 1916, and 30 June, 1918, and during this time trained 27 commanding officers, 55 watch officers, and 58 engineers, which were sufficient to meet the needs of the service in commissioning nine new boats every month. The situation in regard to the noncommissioned personnel was not quite so favorable, since all ratings had to be trained in the regular preparatory course, and

at times it was not possible to train the oilers and seamen for the submarines; thus some of the crews had to be sent to active service without complete training. Thus, about 20 per cent of the ratings were assigned to the submarine service without undergoing the special submarine training course, but these men learned quickly during the shaking-down cruise and the trial trips. The authorization of the Scheer program would have meant a considerable increase in the training schools in order to meet the new requirements of commissioning about 10–11 new submarines every month, but these conditions would have been met by that time (fall of 1918) since the Navy had then definitely decided to expand the submarine service and to place all hopes for victory in the submarine success.

The data given shows that on 1 September, 1918, the submarine service was employing about 18,000 men, including all shore stations, schools, etc., as opposed to 1,400 in time of peace. Thus, in so far as pertains to the personnel, the weapon had expanded thirteen times.

In active service there were 160 submarines (1 September, 1918) having 5,467 men aboard as opposed to 747 in time of peace.

The losses at the front were:

(1) Killed:	
(*a*) Dead and reported dead, 2,415 plus 811	3,226
(*b*) Missing	1,807
(*c*) Died of wounds, etc., at home	83
(*d*) Died of wounds or otherwise, in prison	16
Total	5,132
(2) Prisoners:	
Returned from prison or internment camps	729

Since the number 5,467 includes all the personnel in active service on 1 September, 1918, and even those boats not immediately engaged at the front, the number of dead (5,132) shows that of the personnel at the front at least 50 per cent were killed. All honor to their memory. They were our best.

3. SANITARY CONDITIONS

In general these conditions were better than we had a right to expect in view of the length of the operations. Before the war we counted on five days as the maximum time a submarine could remain at sea, but during the war this time was increased to 11 days (*U–20* in October, 1914), to 18 days (*U–21* in May, 1915), then to 25 days (*U–35* in July, 1915) and even more. The cruise of the *U–53* to America and back lasted 42 days, with only a few hours' interruption, and our submarine cruisers were frequently

three months at sea without any noticeable detriment to the health of the crew.

One must not judge from this, however, that a cruise at sea in these submarines was without hardship. Headaches, dizziness, and lassitude were frequent occurrences, and at times even unconsciousness (syncope). The principal causes for this were the hard living conditions aboard these boats, which, although continually improved by the submarine board, could not be fundamentally changed. To these hardships belong the restricted living spaces, the humidity of the air (in spite of all drying apparatus), the foul air which can not be completely freshened, the noise of the engines, the lack of adequate fresh water for washing, dampness of clothing and the diet of canned goods. The necessity for awaiting the diving alarm at any moment prevented the nerves from being rested. Everything possible was done to ameliorate these conditions and all such improvements were thankfully adopted on board. Thus a better bread was found for the submarine which could really keep, the diet was improved, libraries furnished, the crew were instructed in hygienic measures and they were given careful physical examination before each cruise. The oilcloth was improved and in short everything possible was done to improve the living conditions afloat. In particular, the commanding officers made every effort to spare the men and obtain good food where this was possible. The food was the best obtainable in Germany, even during the period of hunger in the country, and in many instances the diet was supplemented by articles of food which were not to be obtained in Germany at all.

In spite of all efforts to improve the living conditions in the submarine service, in which all the officials, including the constructors and dockyards vied with each other, it sometimes occurred that some individuals in the crew had to be sent on leave to recuperate after a long cruise, but this was rare and usually led to complete recovery and the return to duty in this service by the individuals concerned. For me, it has always been a good proof of the sanitary conditions in this service when the crew on return from a cruise did not utilize the leave granted them for recuperation, but in enjoyment and in visiting their friends. Real sickness and permanent injury to the health was a rare occurrence in this service, and did not occur as much as in the other branches, whereby it should be remembered that the personnel consisted of the younger men, who were carefully selected.

In the further development of the submarines, there must doubtless be several improvements made in regard to the hygienic conditions, but these will not be discussed here, as we have no reason to give away the experience we gained in this field.

Chapter VII

THE EFFECT OF THE SUBMARINE WARFARE

The effect of the submarine campaign on the whole conduct of the war has been described in other places. Among these effects belong the support of the military operations ashore by means of the submarine operations along the coasts (Dardanelles, Syria, Black Sea, Dalmatia, Tunis, etc.) as well as the immediate assistance rendered the army in the sinking of troop transports, munition ships, and cargo ships carrying war material. These sinkings made themselves felt particularly at the Russian front and near Saloniki.

Further, in the description of the antisubmarine offensive by the enemy it was shown what tremendous forces had to be employed exclusively for this service. This exerted an influence on the whole conduct of the war on the part of the enemy and must be attributed to the success of the submarine campaign; the greatest number of men being required for the building of ships to replace those sunk.

The effects of the submarine commerce warfare on the commerce and the supply of food and material for the enemy population is worthy of more careful consideration. Any layman can appreciate the fact that the disappearance of cargo space available on the high seas must result in restricting the commercial traffic and the imports, but it will be necessary to go into the matter somewhat in detail. One can then appreciate that the submarine commerce warfare as well as the other influences of the war resulted in revolutionizing the trade and commercial conditions and thus directly affecting the lives of the population. This far-reaching effect was due to conditions which the submarine campaign found already in existence or which developed out of this warfare. Millions of men were opposed to us on the field of battle, who were taken away from the production of foodstuffs, and who had themselves been added to the list of large consumers. To provision and supply these men in France and England as well as in other areas, especially after the entrance of America into the war, demanded adequate overseas transport of cargoes. The enemy munition factories not only swallowed millions of men, but necessitated the employment of enormous numbers of commercial carriers for overseas transport which were lost to the trade. Germany, Austria, and particularly

Russia, as the greatest exporter of grain, dropped out of consideration for the Allies. The grain which could no longer be obtained from these countries had to be imported from sources farther removed. The enemy measures to overcome these conditions (confiscation of merchant ships for warships and transports, the convoy system, and the bureaucratic administration of the trade, etc.) still further reduced the efficiency of the overseas carriers and paralyzed the trade. These measures on the part of the enemy Governments, which ended in the rationing of the industry as well as the populace, the monopolizing of the entire shipping industry and the railroads, were all conditions brought about to a great extent by the submarine warfare.

On the whole there can be no doubt but that the submarine commerce warfare found trade conditions rather favorable in this sense, as the campaign as such was opened in 1917. That this date was rather too late from a military and political standpoint has already been pointed out and in a restricted sense this is also true in regard to the trade conditions, at least in so far as concerned provisions and food supply. These very essential imports were obtained in peace times from the Baltic, the Black Sea, North America, La Platte, and India, as well as Australia and western Europe. The first two sources were closed to the Allies at the outbreak of the war but this loss did not make itself felt at once on account of the fact that the harvests in 1914 and 1915 were exceptionally rich as well in America as in western Europe. But when the crops in North America were found to be only very moderate in the year 1916, the unpleasant discovery was made that the food supplies from India, Australia, and Argentina could not be transported overseas on account of lack of cargo space for this trade. Thus in England, France, and Belgium, where the food requirements had meanwhile increased, the situation was rapidly becoming critical since in North America there was also a deficiency in labor to harvest the crops. France and Belgium had to be rationed to the point of starvation, while in England things were not much better. Even America was forced to participate in this rationing, although only to a slight extent and not as a result of Government decree. These facts prove the error of those who believe that Germany was the only nation which suffered from want during the war, and also shows that the summer of 1916 was the proper time for us to have commenced the unrestricted submarine warfare, not only from the military and political standpoint but also from the physchological and commercial viewpoint.

In order to show the situation clearly in regard to the trade condition and the possibility of supplying provisions to the enemy

countries, a study of the freight rates, insurance premiums, and shipping prices is illuminating whereby should be included the efforts of the Government to control these matters.

1. INSURANCE PREMIUMS

Without such insurance there can be no shipping or overseas trade even in time of peace. The war and in particular the submarine campaign brought about a two-fold difficulty in this business: First, that of estimating the risk resulting from this largely unknown danger and raising the premiums accordingly, and, second, the difficulty of providing the necessary capital. In time of peace these matters are relatively simple, because those factors which endanger the safety of the ship are known, shipping losses are small, and the ship prices are not very high. Thus, for example, the insurance rates for a voyage from England to North America, or all the way across the Atlantic, amounted to about one-fourth of 1 per cent of the value of the ship and cargo, with very slight variations. With such rates the private insurance companies could carry all losses and still continue in business. At the outbreak of the war, however, these private insurance companies which functioned so successfully in peace times simply suspended business, as they could not judge the risks and fix the premiums. Insurance was not to be obtained, and the shipping industry was stagnant. When the values of ships and cargoes began to increase the insurance companies could not raise the capital necessary to finance these operations. In every country the government was forced to step in and appoint officials to take over the war risks entirely or in part and fix the premiums. The establishment of such government offices prevented the complete collapse of the shipping industry, but the insurance rates remained very high, since the government otherwise stood to lose tremendous sums of money. As a result of the activities of our cruisers in foreign waters, and our auxiliary cruisers, these rates for a voyage to England soon jumped from one-fourth of 1 per cent to 21 per cent of the value of the ship and cargo. This was the first result of a panic, and the rates finally subsided to 4½ per cent and lower. After these rates had finally dropped to about four times the rate in peace times, when the threat of our cruisers ceased, they again climbed to about 3 per cent in December, 1916, or twelve times the pre-war rate, as a result of the submarine activities. The unrestricted submarine warfare then caused these rates to be further increased to 8 per cent, then to 10 per cent, or about forty times the pre-war rate. These rates then gradually fell off, although in February, 1918, the rate was still 4½ per cent. The neutral countries paid even higher rates. However, in the end these amounted to

extremely great sums which had to be paid by either the consumer or the taxpayer, particularly when the great increase in shipping is taken into consideration as a result of the activities of the dockyards and the fact that the war-risk insurance for the crews of these vessels also had to be borne by this government business.

2. FREIGHT RATES

As a result of the constantly decreasing cargo space available which was opposed to an increased supply of freight to be carried and also the reduced performance of which these merchantmen were capable (due to labor shortage, submarine panic, convoy system, and congestion of harbors), the freight rates began to soar in the course of the war until the Government stepped in to requisition the ships and fix the freight rates. Naturally these measures were first felt by their own ships (for example, the British) and the shipping in this country was severely damaged thereby, since these vessels were forced to accept their cargoes for transport at the Government rates, while the neutrals were able to combine and earned six or seven times as much. Before going into the advantages and disadvantages of government control of shipping we shall here give a few examples of the increase which took place in the freight rates. One hundred pounds of American cotton brought from America to England cost about 1 mark in July, 1914. The increase in freight was then as follows: September, 1914, 1.7 marks; November, 1914, 2.1 marks; January, 1915, 4.2 marks; January, 1916, 12.6 marks; and December, 1916, 22 marks. The freight rates for coal, coffee, rice, etc., increased in even greater proportion and at the end of 1917, for example, a voyage from San Francisco to Australia and back netted more earnings in freight than the ships cost to build. Ships which could be chartered for 2.5 marks per ton per month in 1914 cost 50 marks for the charter in 1917. The record was attained by the rates for parcels, which reached $1 per pound from New York to Marseilles.

3. SHIP PRICES

In the year 1914 the shipping prices were very low, and one could purchase in England about the middle of that year a 2,250-ton ship for about 400,000 marks. A sister ship—and this data is taken from an English shipping concern building such vessels—sold for 530,000 marks toward the end of the same year and in the following year for 600,000 marks. These are figures for the beginning of the war. Later on the increase in the building costs was very sharp. Before the war the cost of construction of a freight steamer in England was about 120 to 150 marks per ton, which increased in the beginning of 1917 to 1,200 marks, and further to 1,400 marks and over in 1918.

At any rate, these prices were paid by the State, in this case America, which had requisitioned the ships. The price of ships already in service increased in even greater proportion since these vessels were immediately available, and there are cases on record where a vessel, after 10 years' service, brought more than fifteen times its value when new.

One can imagine the tremendous earnings of these foreign shipyards, and it is not a surprising fact that many of them earned in one year more than their entire capitalization and some paid dividends of over 100 per cent during the war, especially in Holland and Denmark. This apparent growth of the shipbuilding industry was, very strangely, the direct result of the submarine warfare. But this was only a mushroom growth. The entire increase in shipping costs had to be borne by the consumer, who further had to suffer other privations, since the lack of ships, which lay at the root of prosperity of the shipyards and the needs of the population was not radically changed by these conditions.

It is evident that these circumstances, in particular the increase in the price of foodstuffs, should compel the governments of these enemy countries to regulate these conditions in the interests of the people, as otherwise the possibility of being able to hold out seemed to be endangered. Thus it was not only necessary to control and make possible the maritime insurance and keep the rates within reasonable limits (this law was in effect in England a few days before the outbreak of the war) but to control the freight markets and the shipping industry as well, in order that measures might be taken to relieve the situation. The question of replacement ships has already been discussed under the chapter on "antesubmarine measures." The other measures taken by the Government to control trade and shipping for the benefit of the State and the people, or, in other words, to insure the imports of war matériel and food in spite of the submarine warfare, must now be discussed in more detail.

Shortly after the outbreak of the war the English Government requisitioned 25 per cent of their own shipping for war purposes—i. e., troop transports, matériel transports, auxiliary cruisers, hospital ships, and patrol vessels, etc. This measure had been prearranged and did not disturb the rest of the shipping industry, which was then in a position to carry on their trade with greater profit; this, however, being against the interests of the consumer in England, who raised a great outcry against the extortions of the shipyards and shipowners. The Board of Trade was able at times to force the freight rates down with the threat of requisition as well as through the control of import and export permits, but when

more and more ships—the Admiralty and Board of Trade worked hand in glove—were taken over by the Government a new situation was created from which the neutral shipping derived great profit. Since the English ships were more and more threatened with requisition, one preferred to charter neutral ships, which thereupon gradually began to monopolize the freight market. In this monopoly, strange to say, France was able to profit very considerably, since, having loaned Great Britain finally almost 2,000,000 tons of shipping for Government purposes at a low rate, she permitted their private shipping companies to capture this trade and earn large profits. These and other diseased conditions in the shipping industry finally indicated the necessity of putting all shipping and trade under the control of a single individual who would be empowered to make radical changes. As early as December, 1915, the voyage from one neutral harbor to another had been prohibited.

The introduction of export licenses since March, 1916, had operated to depress the domestic prices—i. e., had a favorable effect—which was further increased by the total prohibition placed on the export of certain articles; but all of these measures had no influence on the regulation of the overseas traffic. As early as 1915 quite a few harbors were blocked in part as a result of lack of docking space, labor, cranes, and tugs which had been requisitioned for Government use. It was therefore apparent that radical steps would have to be taken, such as the new construction of quays, etc., and that the previous organization of officials would have to be changed in order that the administration of the entire industry and trade might be placed under one office if the existing confusion in the traffic was to be cleared up. This led to the establishment of the Ministry of Shipping under Sir Joseph Maclay in December, 1916. In a certain sense this step represented a risk, as all previous experience with Government control of shipping had shown certain grave mistakes and delays as a result of the bureaucratic methods which appeared as a consequence. The new minister immediately placed great restrictions on the import of unnecessary articles and prohibited the importation of all articles of luxury. In this manner cargo space was obtained for those articles which were essential. In a few months he had assumed complete control by requisitioning all ships under the British flag, including even the liners, which up to that time had been operating outside of Government control. Thus the entire British shipping was now under one head. This then offered the possibility of increasing the efficiency of the carriers, in that certain distant routes were entirely abandoned and shorter trade routes substituted, thus effecting a saving in both fuel and cargo space. The power of the newly established shipping controller was therefore

tremendous—in London there were 10,000 men employed in the office of the controller alone during the summer of 1917—and there was danger that the operations of this new bureau would be throttled by bureaucratic methods. However, the new ministry did not lose itself in details, but contented itself with the formulation of certain policies and left the detail work to the shipyards, which then became the agents of the transport section of the ministry. The manning, fitting out, and reconditioning of the vessels was the duty of the owner. The ministry regulated freight rates, the exports and imports, and the sale of ships—none could be sold to a foreign nation—and was further the general supervisor of all shipping. The Government further earned money by the fact that although the owners were paid only definite freight rates it further determined the rates that other goods were to pay which were not the property of the Government. These Government rates were low, while the private rates for other goods were five times as much, and the earnings did not go to the owner of the vessel but to the Government. Further, a profit was made on coal since this had to be taken from the Government coal reserves.

For the layman the Government ownership, or as the English express it, this "Nationalization" of the shipping, would appear to be the philosopher's stone since all urgent requirements were thus provided for, while at the same time the shipowners were permitted to share in the profits, if only to a small extent. But this solution of the problem forced on the enemy from necessity as a result of the submarine campaign still had its dark and tragic aspect. What the Government did was to parcel out the shipping to meet the needs of the war and the population; a measure which was not without its grave consequences. That the shipyards during this period of complete nationalization should do a poor business is apparent from the above, but there are still other aspects to be considered. With the increase in prices and wages the insurance paid by the Government soon covered only from one-half to two-thirds of the cost of new construction. Further, the freight rates established by the Government were soon too low to cover the increasing expenses of the shipping companies, since these had originally been figured on a very narrow margin of profit and could scarcely be reduced. Finally, when all vessels had been requisitioned, the shipping concerns then lost their foreign connections, which passed into other hands, principally American. Thus English overseas trade was dealt a very severe blow, which represents one of the far-reaching consequences of the submarine warfare, if one concedes that this nationalization was made essential by the submarine campaign.

In America the Government influence on the shipping industry began some two and a half years after the outbreak of the war and was incorporated in the Shipping Board. Much valuable time was lost, the reason for which was explained in the section covering the building of replacement ships. This board was charged not only with the problem of building and buying new ships, but was required to regulate the shipping in accordance with the requirements of the situation, control the freight rates, award penalties, etc.

In June, 1917, about $500,000,000 were appropriated for the use of the board in order that they might carry on their activities on a large scale. At first about 2,000,000 tons of shipping which was under construction or was ordered confiscated (August, 1917) while the Government construction and the purchase of additional ships was then undertaken. Then all ships over 2,500 tons were requisitioned by the Government, but the principal difference between this procedure and the British was that they paid well for these ships (between $5.75 and $10.50 per ton) and the smaller vessels were permitted to operate for the owners' profit. Thus the discouragement here was not nearly so great as in England, since they were allowed to earn good profits for a number of years. Since many of the smaller ships had been diverted from coastal trade to the ocean trade as a result of the higher profits, foreign ships were then allowed to participate in the coastal trade; later (February, 1918) these smaller ships were withdrawn from this overseas trade and returned to the coastwise trade, including the West Indies. In accordance with the English practice, neutral ships which desired coal were forced to undertake certain definite voyages with cargoes at the Government rates. Soon the neutral shipping was confiscated (for example, 1,000,000 tons of Dutch shipping was taken over, in March, 1918), but the neutral countries were satisfied by the high prices paid, the fact that the war risks were assumed, their return assured, and the rations increased; for example, Holland received 100,000 tons of foodstuffs over and above their ration allowance. With this the neutrals were forced to be content. From the Pacific about 150,000 tons of shipping was forcibly transferred to the Atlantic harbors and in this manner the Pacific trade was left almost entirely to the Japanese. Most of the steamers on the American lakes were transported to the Atlantic coast, some being brought over in two parts. With France about 400,000 tons of steel sailing vessels were exchanged for about half that tonnage in American steamers.

As a result of the much-felt shortage in personnel—the naval reserve had all been used to man the Government ships—the Emer-

gency Fleet Corporation stepped in and established schools for the training of nonseafaring men for all grades in the merchant marine.

One is amazed at the boundless energy which lay at the root of this tremendous enterprise, but even America was forced to learn by experience that the "bureaucratization" of the shipping industry is a precarious matter. Americans themselves calculate the loss in efficient output at the end of 1917 and early in 1918 at 50 per cent. This may be attributed to some extent to the lack of unity of command, since in America the shipping was controlled by the War and Navy Departments as well as by the Shipping Board. This led not only to duplication of effort at times, but in other cases resulted in severe congestion in the harbors, sometimes due to shipping and other times due to railroads. Thus at times the freight cars would be blocking the terminals in some American harbors while at the same time in other places the ships would lie at the docks for weeks awaiting a cargo. Many times the ships were unable to get their coal or the coal could not be brought to them because the available cars were loaded with other freight and the coal could not be brought to the coast. The number of loaded cars on one day in January, 1918, was 7,000 in New York alone, in six other ports along the Atlantic about 41,000 more, while on the same day 213 ships were waiting for coal in New York harbor. This month of January, 1918, was critical for American shipping, since the English food administrator cabled in that month that America must ship 3,000,000,000 additional liters of wheat if England was to hold out. Confusion reached its height. It was even worse in the French ports where the troop transports and the cargo transports were arriving simultaneously.

To remedy this condition the committee for shipping control was established, which superseded the previous three-cornered command, while another similar committee was established to regulate and control the shipping of the Allies in America. Aside from this there was another Government bureau established in February, 1918, which determined which articles were necessary for export and import and in what quantities, while unnecessary articles were stricken from the list. It is estimated that the activities of this bureau saved 1,500,000 tons in cargo space. The Shipping Board sent representatives to all the foreign capitals where the United States was interested in connection with imports or exports and these officials operated there in a similar manner. Finally an effort was made to improve the packing of all wares destined for overseas transport and to reduce the space occupied; thus cotton was pressed tighter, etc.

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In March, 1918, this centralization of control was carried a step farther in that the supreme shipping council was established in London, and interallied groups, which should control the entire tonnage of the countries allied against us in accordance with the known requirements of the situation. However, this council could not, at that late date, exert a marked influence on the further conduct of the war.

The American and English governmental agencies were established with a view toward welding the shipping industry into one of the weapons of the Nation similar to the Army and Navy, and it must be conceded that much may be accomplished along these lines. America succeeded in this manner in gaining considerable ground in this field over England, since the latter was working under greater difficulties and was not always so happy in her choice of methods. On the other hand such Government control or monopoly of a large industrial field as the overseas commerce and foreign trade is always a questionable matter. The guardianship of the state always has a depressing effect on private enterprise and a decrease in capacity and output inevitably result from such extreme centralization of authority. As a consequence of this well-known fact, America and England, as well as the other large powers involved, did not adopt this Government control as a voluntary measure, but were forced to resort to this means as a result of the increasing lack of cargo space caused by the submarine warfare. In this connection that is the principal thing—the far-reaching influence of the submarine campaign on trade and production and its effect on the individuals of the enemy states.

This leads to the question: Was the effect of the submarine warfare on the overseas trade so great and the influence on the food supply and maintenance sufficient so that a favorable decision could have been, or might have been, brought about by this means?

The effect of the submarine warfare and the counteroffensive measures of the enemy countries have been generally discussed in the preceding chapters. Let us hear from some of the inhabitants.

In the last two years of the war neither Australian nor New Zealand wool could be bought. The coal export from both countries ceased. In 1915, although the traffic through the Suez Canal had only dropped off 24 per cent it had fallen off to half of that again in 1917 and, therefore, amounted only to about 40 per cent of the peace-time figure. In Argentine after 1917, it was usual to burn corn instead of coal, since the customary North American coal for the boilers could not be obtained and the excess corn could not be exported. There was little American coal for export and only Italy

was favored in this manner by the artificially stimulated coal exports to that country, and that only to a limited extent. In 1918 all Australian grain storage elevators were filled to overflowing. Millions of bushels of wheat were stored out in the open. A long dam of wheat was built up between the filled sacks which was 16 kilometers long and about 5 meters wide and high. Naturally, the rats pervaded this area, and became infected with disease which they transmitted to the men who were emgaged in fighting them (ringworm). In England the cotton spinning industry had been paralyzed to such an extent that, in the British Navy, for example, the new flags were made of paper, a condition even more serious than in Germany where the navy used cotton flags to the last. It is also known that in Scapa Flow the men who were guarding the German prisoners were interned often begged for the German bread, as it was superior to that which was issued to them. All these conditions were a direct result of the shortage of cargo space, and although the trade restrictions with these outlying countries were ordered by the Government itself, this had been made necessary by the submarine warfare, which had brought about the shortage of cargo space.

The greatest effect of the submarine warfare was the rationing of the enemy population in regards to food as a direct result of the campaign. In fact the submarine warfare had a very similar effect on the enemy countries to the "hunger blockade" on our own, while at times the effect was even more pronounced in the enemy countries in western Europe. None of the enemy counter measures could prevent this, since it was due directly to the lack of cargo space which none of these countries could replenish. The difference was only that the pressure did not last long enough; whether it be attributed to the fact that we were too late in beginning the submarine warfare or that it was not continued long enough. The situation in the enemy countries in 1918 was correctly characterized by Lloyd George in a speech in the fall of 1920 in which he stated: "Had the Germans begun to employ the full strength of their submarines somewhat sooner, who knows whether the British Empire would be in existence to-day?"

On June 4, 1919, the Manchester Guardian wrote: "Had Germany begun the submarine warfare with every means at her disposal from the beginning, the resultant loss in shipping would have been so great that England would have been forced to capitulate." Further, Lord Churchill wrote, in the Sunday Pictorial, of January 12, 1919, under the caption, "Dare I tell it?" as follows: "We just barely escaped. Our success hung by a very slender thread. Only a little more and the submarine warfare would have compelled our

unconditional surrender to avoid starvation." That the Entente was at the end of their resources is amply proven by the statements of Lord Fisher and demonstrated by the weak pursuit after our voluntary retreat.

The German Nation, however, would not or could not carry on. They placed all their hopes in the " International " and a reconciliation of the nations surrendering the victory which they had within their grasp.

Chapter VIII

TWO IMPORTANT SUBMARINE QUESTIONS

The opponents of the submarine warfare, after having been convinced against their will of the possibilities of success which lay with the full employment of this weapon, usually raise two objections to this method of warfare. They say: 1. The submarine warfare, at least the unrestricted warfare, is cruel and inhuman, and this is the reason the world turned against us. 2. In particular, America would not have declared war on us had we not begun the unrestricted submarine warfare.

1. WAS THE SUBMARINE WARFARE CRUEL AND INHUMAN?

War, which is an extension of policy by means of force, is certainly cruel and inhuman, and in its own province the submarine warfare is no exception to the general rule. However, the question here proposed is whether the submarine warfare is especially barbarous, and whether it brought with it a particular manner of conducting war which exceeded all other military operations in cruelty. This may be answered emphatically in the negative. Clausewitz says, in his essay on war: "War is an act of violence, in the application of which there are no limits," and "mistakes which result from kindness are the worst." I can hear now some of our pacificists and "internationalists" crying out, "Yes, but those are just the views of our crazy militarists which we are trying to combat." But what is it that Lord Fisher is always trying to drive home to his own people in his "Memoirs"? "War is the essence of violence. Moderation in war is nonsense. Hit first, hit hard, and keep on hitting." Our stupid humanitarians will have to concede that when one is opposed by an enemy who has been taught such lessons there is no possibility of using moderation or a policy of conciliation. Yes, they must realize, if they are not to blinded by internationalism, that we lost the war because we did not observe this lesson. With particular regard to our submarine warfare we have the testimony of a great many former enemy writers, who even after the war have acknowledged these principles. For example, even during the war, Lord Fisher wrote an open letter to Tirpitz (published in his book in 1919) beginning "Dear old Tirps" and stating that Tirpitz was the only German naval officer who

understood war, and that he (Fisher) did not hold it against him that he had started the submarine warfare. (Fisher evidently thought him the principal advocate of the submarine warfare, although the admiral could not take that position on account of the foreign and domestic opposition.) "I would have acted in the same way, except that our idiots in England would not believe me." With these remarks we might conclude the chapter on the "Inhumanity" of the submarine warfare, but this book is written primarily for Germans who not only have every sort of internationalism in the blood, but who have also been particularly stirred up by the clever propaganda of Lords Northcliffe and Reading, and the Baron von Oppenheim (all internationalists in the service of England). Since we are writing, however, for a public which has been predisposed against us, we shall again put the question: Was the submarine warfare particular cruel in its application—i. e. more cruel and inhuman than other methods of warfare?

From the data given in the first chapter it is clear that we started the submarine warfare as a counter measure against the English "hunger blockade;" and the dates do not need to be repeated here. To-day it is an established fact that the starvation of Germany was a prearranged plan on the part of the Entente, and of England in particular, which had been prepared before the war. This is not only proven by the precision and thoroughness with which these measures were carried out before and after the outbreak of the war, but by the movements of the Grand Fleet itself. The basing of this fleet in Scapa Flow, for the avowed purpose of bringing the German Fleet to battle was a complete failure in that respect, and further it offered no opportunity for the protection of the east coast of England. Both of these facts are proven by the experience of the war. On the other hand Scapa Flow was correctly chosen as a base if, in conjunction with a blockade of the English Channel, we were to be cut off from any overseas trade with the rest of the world. That was the principle object of the British war plan. The object of starving out Germany was still further strengthened by the other measures adopted immediately after the outbreak of the war: the mine field near the eastern exit from the channel (October 2, 1914) the declaration of the North Sea as a war zone (November 2, 1914) and the changes made in the Declaration of London by the orders in council of August 20, 1914, and October 29, 1914, which completely reversed the meaning of this agreement.

From this it is evident that the submarine warfare which we began in February, 1915, was a step to counter this British plan, and not the reverse, though many would try to have us believe even to-day, that England was forced to resort to the inhuman "hunger

blockade" as a result of our submarine warfare. Naturally we would have preferred to conduct the submarine warfare in February, 1915, in its original form, in accordance with the rules for prizes, but this procedure was made impossible for us by the English secret orders regarding the misuse of neutral flags, etc.

Thus the matter stood when we began the unrestricted submarine warfare in the spring of 1917. The systematic starvation of Germany had been carried to such an extent that our neighboring neutrals had been forced, even with privation to themselves, to take part in this illegal "blockade," and we had no other choice, unless we were willing to capitulate and throw ourselves on the mercy or lack of mercy of our enemies. How often we made the proposal to abandon the submarine warfare if England would accept the doctrine of the Declaration of London!

If the submarine warfare demanded more victims than would have been the case had it been conducted in a milder form, the blame for the bloodshed does not rest with us but with the originators and advocates of the "hunger blockade," which was the basis of the English war plan.

When one reads in English books that the English naval officers, in the same position as our submarine commanders, would have carried on the war with more regard for humanity and still obtained better results, this is in itself a contradiction. It is, however, a well-known scandal that where such rare opportunity offered (Sea of Marmora, Dalmatia, Swedish coast) they did torpedo vessels in a ruthless manner without warning and in the Baltic they violated all the rights of neutrals. Thus in October, 1915, they sank four German steamers in the territorial waters of Sweden without warning, although there could be no possible counteroffensive. Further they sank both passenger and mail steamers in the Sea of Marmora without warning, and torpedoed the *Madeleine Rickmars* (Red cross flag, 100 wounded on board) in the same manner. In the Adriatic passenger steamers were sunk without warning, and on March 8, 1916, the Austrian hospital ship *Electra* was twice torpedoed in broad daylight off the Dalmatian coast. (French submarine.) There were also a number of other cases similar to this in 1915 and 1916, or before we opened the unrestricted submarine warfare. It is a particularly interesting fact that on May 5, 1915, the Turkish passenger steamer *Stambul* (700 passengers) was sunk without warning by an English submarine. That was two days before the *Lusitania* incident. (May, 1915.) There was an angry outcry against the sinking of the *Lusitania*, but nothing was said about the sinking of the *Stambul*.

In regards to these incidents which might have been prevented by a better organized antisubmarine offensive (in the Adriatic, Baltic,

and near Turkey) we are forced to deny the right of the enemies to bring the accusation of "inhumanity" against the methods of our submarine commanders in the conduct of war. On the other hand, these officers always and wherever possible, not only gave the passengers and crew opportunity to abandon the ship, but even provisioned the boats and towed them in near the coast, or at times took them on board the crowded submarine for transfer to some neutral vessel. There are many cases of foreign testimony of such humane treatment. When the enemy antisubmarine offensive finally rendered such mild procedure impossible by preventing the submarine from coming to the surface in the daylight, the blame does not rest with our submarine commanders.

But we even torpedoed hospital ships? Yes, as many as three were unjustly torpedoed in accordance with the views then held by the naval staff, while a fourth case was indeterminate as the submarine in question did not return. Finally the Government was forced to permit the torpedoing of hospital ships in the English Channel since these ships were held to have the same status as our own hospital trains behind the lines, which were constantly attacked by the enemy aircraft or bombarded by their artillery. In a great number of cases the enemy bombed our field hospitals, which were well known for many weeks and plainly marked with the proper insignia, killing and wounding our hospital personnel. As a result of such unwarranted attacks one would have been justified in torpedoing any hospital ship wherever they were found as a warning and this should have been sufficient. For example, such torpedoing in the Mediterranean would have considerably hindered the enemy prosecution of the war, but one could not agree to such measures in spite of all the enemy violation of similar rights. We contented ourselves with laying a few mines in the areas outside the English Channel and two hospital ships were lost on these mine fields, while three or four others were sunk by submarines in violation of the rules for the conduct of war. Which of these were sunk purposely or which were sunk by mistake at night or in thick weather is not known to me; only one of these cases has been completely and fully explained. If such vessels were actually sunk purposely, then it is to be attributed to disobedience of orders on the part of the submarine commander concerned, and such conduct can not only be explained as a result of the Baralong incident or the well-known cases of mistreatment of our submarine personnel when taken prisoner, but by the fact that these officers were convinced that the hospital ships were being misused by the English. We were constantly in receipt of information from returned prisoners and agents that these hospital ships were not only laden with wounded but

that war material was being transported as indicated frequently by the deep draft of these vessels. One case of this kind is well known (torpedoing of a hospital ship on the basis of such information) where the case was brought to trial before the court in Leipsig as a result of pressure from the Entente and which ended with the conviction of two "guilty parties." A sweeping criticism of this unjust conviction can be read in the book published by Dr. W. Hofacker ("The Leipsig Trials"). In any event this case was certainly no worse than the accidental bombing of a field hospital or a hospital train with shell or aerial bombs, an accident which was of frequent occurance, which did not cause the air service to be discredited by the enemy or loosen a storm of indignant protest.

We now come to the conclusion that the submarine warfare did not exhibit especially cruel motives, and was like any other war measure, while the number of its victims was relatively small considering the great effectiveness of such warfare.

According to the Marine Engineer about 30,000 men were killed as a result of the German submarine warfare, of which about half were in the English merchant marine. The other half comprised personnel of other navies and a very small proportion were passengers. The deaths of these latter are to be regretted, but in so far as these passengers were traveling on business they were engaged in operations against us, and where such travel was performed through the restricted areas with women and children for pleasure, such procedure must be characterized as a piece of inexcusable folly, in the nature of the existing situation. Even the danger of mines, which at the time was not overcome, should have deterred them. But even this number of 30,000 loses its importance when considered in comparison with the tremendous number of men engaged in the war. The war on land demanded the sacrifice of a great many more victims who were caught by the armies, and being unable to escape promptly from their homes, were overwhelmed by the effects of the war. And further, this is the principal point: What does the number 30,000 represent in relation to the large masses of people in Germany who were the victims of the English "hunger blockade?" The German department of health reported in 1918 that based on official data, 763,000 more people died in Germany during the war than normally as a result of the "hunger blockade." The deaths in Germany from tuberculosis alone in 1917 showed an increase of 30,000 more than in 1913. Thus in one year the victims of the "hunger blockade" amounted to more than killed in the whole four years by the submarine campaign. And these were all civilians, women, children, and old men. How many have died since, and how many of the children of those days will have to suffer

broken health and sickness for the rest of their lives as a result of this inhuman measure? But that was just the aim of the British "hunger blockade," which, by breaking down the physical resistance of the German civil population, actually did win the war. But in view of the enormous losses in blameless lives which we sustained as a result of this measure, the enemy countries should cease to lie about the "cruel" and inhuman submarine warfare which was the only means we had at our disposal for escape from the tortures of the "hunger blockade." Even our own pacificists should at least try to judge the matter impartially in view of these figures; but that the internationalists should take the side of their own allies in this matter is hardly to be expected. In 1918, F. W. Wile wrote a challenge under the title "The Huns of 1940," in which he states that "Ten thousand of unborn and as yet unconceived Germans will be cursed for life with physical inferiority and the principal disease of such unfit Germans will be the English (T. B.). Whereby this designation is to be taken in the double sense.

2. WOULD AMERICA HAVE REFRAINED FROM DECLARING WAR ON US HAD WE NOT STARTED THE UNRESTRICTED SUBMARINE WARFARE?

The answer to this question, which has been frequently asked in Germany, appears to many to be given by the fact that shortly after our declaration of the unrestricted submarine warfare the United States of America broke off diplomatic relations with us and joined the Entente. It was not this more acute form of submarine warfare and the indignation which was aroused thereby that actually caused America to take part in the war against us, but the fact that in the spring of 1917 England was in such a critical position that she appeared to be about to lose the war. This consideration had to force the United States into the war no matter on what grounds it was proclaimed. · In any event the submarine warfare was partly instrumental in bringing about this condition, but then so was every other German success, such as the defeat of Rumania, and also our then favorable position on the western front in Europe, all of which threatened England's security. In any event, Wilson believed that his beloved England was seriously threatened, and that therefore the time was ripe for active participation in favor of that country. The root of the matter lies in the fact that the American President had long since decided not to permit Germany to obtain a victory and to support England with every military means as soon as that country should be seriously threatened. In this decision he was not only influenced by the financial interest which the Nation had in an English victory since the beginning of 1917, but also by political and personal relations, these being the factors which brought about those strong connections.

Wilson was the man who prevented the German loans being floated in the United States and characterized them as unneutral, while on the other hand he demanded the delivery of war material to the Entente as being within the rights of neutrality. In taking this position he brought about the situation as planned whereby the consequences finally led to the entrance of America into the war on the side of the Entente. If there are still men among our pacifists and democrats who believe that Wilson was a friend of Germany in disguise, who was not able to act as he wished, even after his "defeat" in Paris—in reality it was no "defeat," but the achievement of a carefully planned aim—this is only explicable on the ground that every one has a right to make a fool of himself in spite of the facts. This must be particularly hard for some men—such as our former ambassador to Washington—who helped to bring out the German vote to assist in Wilson's reelection and otherwise laid himself open both politically and diplomatically. These men, however, should consider that they lay themselves open to the charge all the more so long as they continue to praise Wilson.

It is evident that American judgment of the deceased President must be, and naturally is, quite different from the German. Although Wilson fought Germany in every way during the war and even before the war, and finally shamefully deceived her, America knew how to obtain the benefits of the war and the peace which followed. In her own eyes and in the opinion of the world America to-day stands as the sole winner of the war, if we except the neutral powers. The fact that that country helped the Entente to completely disorganize the whole of Europe and that American will also be forced to suffer from the result of that piece of infamy, will be long of realization.

The best explanation regarding the methods and policies of Wilson is obtained from Tumulty, his former private secretary, who although not disclosing everything, still manages to divulge the principal facts. In his book on the Wilson policies during the war, Tumulty states that shortly after his election (1912) he was filled with the idea of a European war; and with regard to such war he could only have had Germany in mind, as indicated by the well-known speech of the then Commander, later Admiral Sims, on "the last drop of blood and the last dollar," which was made in England. Further, there were unwritten agreements between the two Anglo-Saxon powers in connection with a war which was in existence at that time (determination of Professor Koher), while Wilson's election was based on English-Jewish financial support. Early in 1916 he addressed the railroad employees who threatened a strike with the words, "Don't you know that you would interrupt

the delivery of war material to the Allies and that the battles they are fighting are being fought for us?" This at a time when he was campaigning for reelection under the slogan, "He kept us out of war," and through the German ambassador assured himself of the German-American vote, without which he could not have been reelected. During the same spring, while on a tour of the Western States where feeling was rather bitter against the English measures of coercion against trade, he said quite openly that he would never give in to the large mass of American voters who urged war against England. From this one must conclude that even at this time—i. e., one year before the opening of the unrestricted submarine warfare—Wilson was already fully determined on his course. In connection with this part of Tumulty's book, a German-American newspaper wrote that no diplomat had ever been more deceived than the German ambassador, who was made to think that in Wilson Germany had a well-wishing friend. From the very first day of the war England became everything to Wilson and Germany nothing, so that his decision to enter the war on the side of England did not date from the time of the unrestricted submarine warfare or the *Lusitania* incident, but from the day that it was apparent that England would not achieve a rapid victory. His open striving toward this end began with the resignation of Bryan, who, as a pacifist, was really in earnest in his efforts of mediation and who was forced to resign his office as a result of the failure of his diplomacy. Wilson, who had declared the neutrality of America, then prohibited a German loan, but placed the industrial strength of America at the disposal of the Allies and permitted full sway to the Anglo-French propaganda, since this was in accordance with his desire to incite the Nation against Germany. When Wilson was finally able to declare war he said to Tumulty: "I foresaw this from the very beginning, but could not go faster than the mass of the people would permit." In the summer of 1919, when cornered by Senator McCumber, he said that he was convinced that America would have gone to war with Germany even without the provocation of the unrestricted submarine warfare. Do not these examples suffice to show that it was not the submarine warfare but the Wilson policies which brought America into the war against us? I should think so. At least for those who are not responsible for misleading the German people into thinking of Wilson as a friend of Germany, who was turned against us by the submarine warfare. The others, however, who still defend the attitude of Wilson toward Germany, only expose their ignorance.

Yes, say the opponents of the submarine warfare, the former German ambassador in Washington, Count Bernstorff, has testified in the Erzberger Helfferich trial that up to January 31, 1917, "Wilson

was a good friend of Germany," and that American views confirm this estimate on the part of the ambassador. For these I shall quote again from American sources as follows: In the summer of 1915, or about two years before the opening of the unrestricted submarine warfare, Wilson had a conference with the New York banker Baruch in Washington, in which Baruch "convinced Wilson of the necessity of the United States entering the war on the side of the Allies." Wilson then asked Baruch "to go into more detail and elaborate further on the idea." In the early summer of 1916 Baruch was then made the head of a secret organization which was to purchase large quantities of munitions for a campaign overseas and to arrange for the transport facilities for such material. That was about three-quarters of a year before the 1st of January, 1917. The German ambassador could have known nothing about this and other matters which have been described above.

Chapter IX

THE FAILURE TO OBTAIN A VICTORY

The reasons why we lost the war are clear to-day, and the only doubt which may exist is whether the principal reason is to be assigned to the English "hunger blockade" or to the revolutionary undermining of the national spirit. One can frequently hear the opinion expressed that the "hunger blockade" was responsible for the breakdown of the physical resistance of the population in 1917 and 1918 and thus prepared the way for the inclination to accept the overthrow, and undoubtedly this fact had something to do with the lack of opposition of large masses of the population to such revolutionary ideas. However, it would be erroneous to ascribe this simple cause to the result, since these revolutionary doctrines had taken root long before the efforts of the "hunger blockade" began to make themselves felt. Later, the idea was certainly widespread that only an overthrow of the Government could relieve us from our distress, but this belief, in so far as it was not a matter of self-deception, was disseminated and nourished by the agitators. It certainly was a case of self-deception when the German people imagined that they were no longer in a position to endure hardships of the war. The armistice and the "peace" which followed really demonstrated what we were actually in a position to endure. The agitation, however, which held out the hope of a quick and a happy peace to follow the overthrow of the Government, was based on false assumption, if not deliberate lies. In any event the revolutionary propaganda was an independent factor throughout, which can not be charged directly to the "hunger blockade."

The final result of this domestic political underhand work with which the revolutionaries undermined the foundations of the State, was designated by the English general staff as the "dagger thrust" which achieved its purpose for the Entente. If we consider the events at the time of the armistice then it is apparent that this event at the decisive moment may be compared to a stab in the back for our defense. But all these matters should be considered in their proper relation to each other and the events of the fall of 1918 which then suddenly appeared on the surface, will be seen to be the consequence of systematic poisoning of several years duration. The progress of this poisoning was better known to the enemy than to our-

selves, not only because a person outside of a country can observe conditions more objectively than the people of the nation in question, but because those individuals belonging to the revolutionary or pacifistic circles or those who wished to end the war for other reasons, kept the enemy continually informed regarding the progress of this effort to poison the national consciousness. Thus the enemy was enabled to withstand our blows with patience and to await the inevitable effects of this poison. This was certain to come, and in the near future, as was readily apparent from the symptoms of the sickness. The German Nation had a similar hope only in regard to Russia, since the other enemy nations did not display any of these symptoms of national sickness, which might have raised our hope for victory. It has been frequently stated that our Government actively participated in the Russian collapse, and this judgment is correct if one agrees that matters in Russia would have taken the same course in any event even without our assistance. In any event, our own people certainly received an influx of this poison from Russia after the Treaty of Brest-Litovsk, and the reestablishment of diplomatic relations with that country, which was a decisive factor on the outcome. Will the other nations also have to pay in a similar manner for the part they took in the poisoning of the German Nation? The drift from nationalism to internationalism in England and France at the present time appears to me to be the first step along this road.

As a result of the November revolution the submarines, our only effective weapon, was knocked from our hand, although the boats themselves were in nowise involved. When they were finally overwhelmed by the red tide they were able to say with Blucher at Ratekau: "We capitulate because we have no provisions or munitions left."

But from still another standpoint the revolution had less to do with the submarines than with any other branch of the service and in order to investigate the conditions which prevented the submarine from attaining its final success we can not restrict ourselves to a consideration of the events of the fall of 1918. We must remember that the submarine warfare was begun in the spring of 1917 with the idea of bringing the war to a close by the end of the year. If this did not occur then the submarine warfare was still effective but could not suffice to force the decision by itself.

Why did we not obtain our victory in 1917; i. e., why was not England forced to capitulate then?

It has already been stated that the calculations of the naval staff on which the submarine campaign was based were basically correct, even though it was risky to announce a definite period of five or six months for the success of these operations. We know that this was

done in order to obtain authorization for the submarine campaign to begin at all; but in spite of that it was a precarious matter, since the figures were based on conditions in 1916, the antisubmarine offensive had been greatly improved in the meantime, and above all care had to be taken to avoid deceiving the people. The principle fault, which could not have been taken into consideration in these calculations and could not have been foreseen at the time, was due to the domestic political situation in the year 1917. These events, without being known to us, were preparing during the years 1915 and 1916, and were the factors which brought our submarine success to naught. That otherwise our submarine calculations were correct is evidenced by such a level-headed person as Admiral Jellicoe, who predicted in March, 1917, that England could only hold out until November, 1917. The American Admiral Sims states in his book in the chapter entitled "While Germany was winning the war," that not only the first sea lord but all other high officials and the American ambassador in London were of the same opinion. There prevailed the greatest pessimism in these circles and only the English public remained optimistic as they were being fed on lies. Although Admiral Jellicoe himself modified this statement by adding, "unless we are able to stop them soon." But did this occur? Did not the admiral add further that such a means had not been found? And did we not even exceed the monthly tonnage sunk up to November 1 which was required by our calculations?

But still the victory was denied us, since the enemy in the course of the summer of 1917 learned with certainty that those circles in Germany which did not want to win the war had obtained the upper hand and that our enemies need only grit their teeth and hold out with patience, we would defeat ourselves in the end. There was ample historical evidence of this from the past.

The realization of these facts was not unexpected on the part of the enemy but they were rather prepared for such a condition after the events which transpired in Germany before we began the unrestricted submarine warfare. Among these were the "hunger strikes" (in reality revolutionary strikes) in Berlin and Braunschweig in June, 1916, the "hunger demonstration" in other German cities, and further the great strikes in the munitions industry in April, 1917.

There was also among other things the slogan disseminated in Bern and Zimmerwald containing the fatal words "The victory of the German arms means the destruction of social democracy." This was an announcement to the enemy that there was a party in Germany which did not want victory and which would even work against such a victory.

These circumstances might not have made a strong impression on the Entente and might even have been considered merely the natural result of the oppressive conditions resulting from the war, had not revolutionary pamphlets appeared amongst the troops explaining the meaning of the strikes; and these came to the knowledge of the enemy. (June and July, 1916.) This was provided for by the secret publication "Spartacus" (later the "Spartacus letter") which was published fairly regularly in Germany since September 20, 1916, as well as the German revolutionary organizations in foreign countries (Switzerland, Holland, etc.). These groups, whether called deserter's organizations, training organizations of Jewish workers or otherwise, were in reality organizations built up by the revolutionary agents, were supported by the secret service of the enemy, and not only betrayed military secrets to the enemy but also—and this was even more important—furnished them with full reports on the domestic political events in Germany. For this purpose they maintained close relations with the revolutionary organizations in Germany and were able to keep the enemy informed in detail in regards to the progress of the revolutionary activities in our country.

It is not easy to trace these relations between the revolutionaries at home and all these foreign groups since they have since lost the courage which prompted them to take this course. However, shortly after our collapse there were a number of publications of the revolutionaries in which they told almost all of the truth of this matter; at that time taking a certain pride in their actions, while to-day they would rather not have been the guilty parties, and maintain discrete silence. Such books, for example, are, "The underground literature in Revolutionary Germany during the World War" by Ernest Drahm and Susanne Leonhard and "From the Workshop of the German Revolution" by Emil Barth. Also "The Secret of Crewe House," central bureau of English spies disclose some but not nearly all of these secrets, as the author wished to spare those traitors who are still living amongst us. The party, contrary to the ideas of Liebknecht, who sought to incite the masses to revolution, which worked in our own and foreign countries along practical lines for this end, was the "Social Democratic Workmen's Commune," organized in March, 1916; after the U. S. P. D. From their headquarters in Berlin, Hamburg, Cologne, Stuttgart, and Munich there was a systematic distribution of revolutionary literature at the front, organizations were formed to aid deserters, and the revolutionary youth at home was organized into camps ("free student corps," "revolution youth," etc.). From these revolutionary centers there was soon established a regular courier service to the secret service

agents of the enemy in Holland, Switzerland, Denmark, and Sweden. The majority social democrats did not participate actively in this matter to any great extent although they had much in common in theory and at the last moment were those who profited most by the revolution. In the beginning of 1917, a large number of agitators' sheets abroad began to bring pressure to bear (for example, "Der Kampf," "Michel in Sumpf," in Holland "Freie Zeitung," and "Freie deutsche Wort" in Switzerland). These papers which were published in foreign countries by Germans and supported by enemy gold, served the double purpose of spreading revolutionary doctrines in Germany (they were scattered throughout the country in profusion) and keeping the enemy countries continually informed regarding the progress made by the revolutionaries in Germany. The enemy was therefore not forced to rely on individual agents for their information and could further so control these publications that they would exert considerable influence on the mass of the German people. Even the French paper "Kriegsfackel" which was published in the German language, had the active assistance of Germans. Even the enemy did not need to concern themselves with making further indictments against the Germans, since the Germans themselves took over this service, the people naturally being more readily convinced in this manner than by the French and English propaganda.

All these events had taken place when the unrestricted submarine warfare was commenced. It is probable that in the enemy countries one thought that the submarine warfare which was such a blow to their security, would serve to revive the war spirit in Germany. But just in the summer of 1917 as this campaign was really beginning to be effective there occured a number of events which clearly showed the Entente that the contrary was the case and that the German people placed no hopes in the success of the submarines, that this new manner of conducting war did not have their sympathy, and that they not only did not want to win the submarine warfare but opposed our winning the war at all. Thus the enemy countries were clearly shown by the events of the summer of 1917 that the Germans wanted peace at any price and further that an overthrow of the Government was acceptable if it would bring about this result.

The summer of 1917 brought with it the mutiny in the High Seas Fleet (on some of the battleships and two light cruisers), the primary object of which was to bring about the end of the war by passive or even active resistance on the part of the crew. The investigation which followed after this movement had been suppressed showed very plainly that the mutiny was organized and directed by the U. S. P. D. (members of Parliament) and that the crews, as in

all such agitations, had been told that the same organization was in effect in the enemy countries and that the sailors of the English, French, and Russian fleets were only awaiting for the German enlisted men to make the first move, whereupon they would all fraternize and bring about the peace. This motto, which was to make the treasonable activities of the men more palatable, remained the same up to November, 1918. It was an out-and-out lie, but was generally believed and caused us to be more lenient in our attitude toward these poor deceived men. Thus, for example, the crews believed in the systematically disseminated radio messages which were spread through the fleet in November, 1918, "The English Fleet is lying off Borkum with the red flag hoisted and awaits fraternization" and "The enemy of peace, Marshal Foch, has been assassinated by his own men." The efforts of the officers to convince these men of the real truth were held as deceptions practiced in the line of duty. In a similar manner, these easily led men were deceived regarding the last attempt of the fleet to offer battle and were incited to mutiny. At that time there were pamphlets disseminated amongst the men stating that this undertaking was being carried out on the sole initiative of the officers and that the people were opposed to it. It was represented to the crew that it was their duty to prevent the fleet from standing out. It will be readily appreciated how such things came to be accepted by the men, and it is a wonder that whole ship companies, or even divisions, did not all fall into this clever trap of the revolutionary leaders. These agitators had meanwhile learned their lesson in propaganda from the clever Lord Northcliffe in regards to its psychological value.

But to return to the summer of 1917. The worst of these mutinies was not the mutiny itself which was soon suppressed and stamped out, but its further effect in the Parliament itself. If one is to prevent a repetition of such occurrences it is necessary not only to bring to trial the tools but to indict the wire-pulling leaders—i. e., the guilty delegates to the Parliament—but this attempt on the part of the Chancellor was successfully opposed by the majority of the delegates to the Parliament. What a spectacle for the world and in particular for our enemies! Which of them could now believe that we had any desire to win the war or that we placed any hopes in the submarine campaign which was then at the height of its effectiveness? If England had reason to doubt the seriousness of our diplomacy, in so far as the submarine warfare was concerned, this doubt must have been further strengthened by the fact that it was not supported by the people's representatives. And even worse than that.

The enemy countries now realized that there was a party in Germany which was working to overthrow the Government and that this group had close affiliations with the Left and Center. The enemy could take comfort in the fact that they must eventually win. Thus, in the eyes of the world, it was clearly evident that our collapse would follow soon if only the enemy could manage to hold out. The "hunger blockade" alone would suffice for this, the enemy did not need to win a single victory, as the Germans were about to defeat themselves again.

A quite similar impression must have been created abroad by the peace resolution which was proposed on July 19, 1917, by the majority party under the influence of Erzberger and Scheidemann against the opposition of the Nationalists. Abroad, this fatal resolution made it known to our enemies that the German representatives dared to take a course opposed to the Government and that the majority of the people had no further will for victory. The way pointed out by the Parliament meant the victory of the Entente. The fact that they desired a peace without annexations and reparations, which was not to be had, and demand the impossible of the Government, showed that the majority had already placed themselves under the dictatorship of our enemies and that they had broken away from their own Government. The underlying motive of this resolution, which was to lead the people to believe that the Government could have a peace on the basis of the "status quo" if they only wished it, and in this manner to incite the whole nation against their Government, may not have been fully appreciated by all of the delegates to the Parliament. However, the revolutionary originators of this measure were fully aware of its importance and abroad this peace resolution of the revolutionaries was quite properly hailed as a new victory.

At about this same time the very closely guarded secret report of the Austrian Prime Minister, Count Czernin, dated April 12, 1917, became known to the enemy. This report, which was quite unnecessarily intended to strengthen the will to war of our Government, played into the hands of the Entente in two different ways. In this manner it was utilized to strengthen the war aims of the Entente. These events which took place in the summer of 1917 were the principal factors which served to break the force of our submarine campaign, and which blunted the edge of this deadly weapon. Even the indecision of our diplomats, who completely failed to comprehend the submarine warfare and were lacking in backbone, could not even be compared to this in its devastating effect.

Above all this peace resolution and the protection of the revolutionary leaders by the Parliament furnished in themselves the answer to the question, "Who was to blame for the loss of the war?"

Even to-day in Germany one can hear educated men discuss this question, and it is usual for them to ascribe the loss of the war to separate or individual circumstances and thus to blame one or more men for the outcome. This still occurs, although we suffered no great defeat or real catastrophe either on land or sea; such a much-discussed point is the battle of the Marne which was really not a decisive defeat and has been much exaggerated in regard to its influence on the course of the war.

In reality we did not lose the war either against France, England, or America, as we remained unconquered both on shore and afloat, but the unfortunate outcome of the war is to be attributed entirely to the victory of internationalism over German patriotism. From this is not to be understood that we were opposed by a coalition of international powers and that we were defeated by such combined strength and capital. Had the German Nation been really united and presented a solid front to the enemy we could have been and would have been victorious even without the combined strength of internationalism. But since we, as a result of a defect in our character, are always inclined to regard ourselves as citizens of the world and to sacrifice the needs of our own country to the interests of humanity as a whole, so in time of war this could not prevent the considerations of outside interests from triumphing over the vital interests of our own country. That is the root of all evil which is derived from Marxism, international Jewry, ultramontanism, pacificism, communism, and all other appearances of German internationalism, which sap the strength of our national unity. From this root grew the indecision of our diplomats, the reprehensible attitude of our Parliament, the treason and finally the Revolution. This domestic internationalism, or better expressed, the lack of a national consciousness, dealt to us the final blow and in the end defeated us.

If one realizes the cause of an illness the road to health is generally known, and in this case it is quite clear that our national illness caused by this internationalism can and must be healed by a return of national consciousness, true patriotism and pride in our country. We must, however, realize that the poison of this internationalism has penetrated deeply into our veins, and that the healing process will of necessity be very long. For to-day the international viewpoint is less rooted among the masses of the people than it is preserved in the German mentality in the form of dogmas and party doctrines, which have been circulated amongst the people for a decade or more, and have become something in the nature of a creed. Tireless effort will be necessary to restore the body politic, and the battle against this poison in our national life

must be fought not so much with the head as with the heart. Time will be our ally in this battle, since the old, old lesson must be learned again that a nation which does not hold the national honor above all else will be trodden under foot by its enemies.

Let us not cry for foreign help. We need expect no solution of the problem from international solidity. We must remember that the roots of our strength lies within ourselves, and that we are unconquerable if we rid ourselves of foreign poison and remain true to our own race. There is no greater duty or higher law. We need no outside help to find the way, as the road lies within our own boundaries. Let us go our way, undisturbed by wild international fancies, and not to be led astray by dogmas and party doctrines, and we will be invincible. Help yourself and God will help you, was the motto of our submarine heroes.

Hold fast to your own Fatherland,
Remember this with all your heart.
This is the source of all your strength.

LIST OF SUBMARINES FOR WHICH CONTRACTS WERE AWARDED

SUMMARY

(a) Peace-time boats

1.	Gasoline submarines (*U–3–18*)	16
2.	Diesel submarines (*U–19–41, 43–45*)	26
3.	Fiat submarine (*U–42* not delivered)	1

(b) Boats ordered during the war

1.	Norwegian submarine (*UA*)	1
2.	M type (*U–46–65, 81–116, 158–172, 201–212, 229–276*)	131
3.	Austrian boats (*U–66–70*)	5
4.	Large mine-laying submarines (*U–71–80*)	10
5.	Improved mine layers (*U–117–126*)	10
6.	Improved M type (*U–127–138, 213–228*)	28
7.	Submarine cruisers (*U–139–141*)	3
8.	Improved submarine cruisers (*U–142–150, 173–200*)	37
9.	Commercial submarines (*U–151–157*)	7
10.	Type D submarine cruiser (*K–44*)	1
11.	B–1 type (*UB–1–17*)	17
12.	B–2 type (*UB–18–47*)	30
13.	B–3 type (*UB–48–249*)	202
14.	C–1 type (*UC–1–15*)	15
15.	C–2 type (*UC–16–79*)	64
16.	C–3 type (*UC–80–192*)	113
17.	F type (*UF–1–92*) single hull boats	92
	Total	811

In the following table B means bow tube, S stern tube. The power of the electric installation for submerged cruising is given in kilowatts. The dates are given for trial trips.

Submarine No.	Contract awarded date	Commissioned date	Displacement		Torpedoes and mines				
					Torpedoes			Mines	
			Surface (tons)	Submerged tons	Above water	Submerged	Caliber	Tubes	Number
3-4	August, 1907	May and July, 1909	420	510		2B 2S	6:45		
5-12	April, 1908	July, 1910, August, 1911	500	620		2B 2S	6:45		
13-16	August, 1909	December, 1911, April, 1912	540	635		2B 2S	6:45		
17-18	May, 1910	November, 1912	560	690		2B 2S	6:45		
19-22	November, 1910	July, 1913, November, 1913	650	840		2B 2S	9:50		
23-26	March, 1911	September, 1913, May, 1914	670	860		2B 2S	9:50		
27-30	February, 1912	May, 1914, August, 1914	680	870		2B 2S	10:50		
31-41	June, 1912	September, 1914, February, 1915	680	870		2B 2S	6:50		
42		Not delivered	690						
43-50	July, 1913	April, 1915, July, 1916	720	940		4B 2S	6:50		
51-56	August, 1914	February, 1916, June, 1916	720	902		2B 2S	8:50		
57-62	October, 1914	July, 1916, December, 1916	780	950		2B 2S	7:50		
63-65	March, 1915	March, 1916, May, 1916	810	980		2B 2S	8:50		
66-70		July, 1915, September, 1915	810	980		4B 1S	12:45		
71-80	January, 1915	October, 1915, June, 1916	750	880	1B 1S		4:50	2S	36
81-86	June, 1915	August, 1916, December, 1916	810	950		2B 2S	10:50		
87-92	do	February, 1917, October, 1917	760	1,000		4B 2S	12:50		
93-98	September, 1915	February, 1917, May, 1917	850	1,000		4B 2S	16:50		
99-104	do	March, 1917, August, 1917	750	950		2B 2S	12:50		
105-114	May, 1916	July, 1917, June, 1918	800	1,000		4B 2S	16:50		
115-116	September, 1916	Not delivered	880	1,230		4B 2S	13:50		
117-121	May, 1916	March, 1918, August, 1918	1,160	1,510		4B	24:50 12	2S	42
122-126	do	May, 1918, October, 1918	1,160	1,470		4B	22.50		48
127-130	do	Not commissioned	1,220	1,650		4B	14:50		
131-134	do	do	1,200	1,530		4B	14:50		
135-138	do	June, 1918, August, 1918	1,180	1,530		4B	14:50		
139-141	August, 1916	March, 1918, June, 1918	1,930	2,480		4B	19:50		
142-150	November, 1916	Not commissioned	2,160	2,770		4B	19:50		
151-157	February, 1917	May, 1917, February, 1918	1,510	1,870		2B	18:50		
158-159	do	Not commissioned	810	1,030		4B 2S	14:50		
160-172	do	6 boats May, 1918, October, 1918	820	1,000		4B 2S	14:50		
173-200	June, 1917	Not commissioned	2,130	2,780		4B 2S	19:50		
201-212	December, 1917	do	820	1,000		4B 2S	16:50		
213-228	May, 1918	do	1,880	1,880		4B 2S	18:50 (12)		
229-276	June, 1918	do	900	1,210		4B 2S	13:50		
A (?)			270	340		2B 1S	5:45		
B-1-17	November, 1914	January, 1915, May, 1915	127	142		2B	2:45		
B-12	do	March, 1915	147	161				4	8

Guns' caliber cm.	Cruising radius				Speed in knots		Diving time (seconds)	Engines		Complement	
	Surface		Submerged		Surface	Submerged		Surface horsepower	Submerged horsepower	Officers	Crew
	Miles	Knots	Miles	Knots							
1:5	3,000	9.0	55	4.5	11.5	9.5	60	2:200	2:505	3	19
1:5	3,400	8.6	80	5.0	14.2	8.1	65	4:225	2:580	4	24
1:5	1,920	14.8	90	5.0	15.0	10.7	40	2:350 2:250	2:550	4	24
1:5	1,210	13.5	75	5.0	15.0	9.5	70	4:350	2:550	4	24
1:8.8 1:10.5	5,200	8.0	80	5.0	15.5	9.6	75	2:850	2:550	4	35
2:8.8	5,020	8.0	85	5.0	16.8	10.3	84	2:900	2:550	4	35
2:8.8	5,520	8.0	85	5.0	16.7	9.9	45	2:1,000	2:550	4	35
1:10.5	4,440	8.0	80	5.0	16.5	9.5	50	2:925	2:550	4	35
----------	1,500	18.0	24	8.0	18.0	10.0	30	2:1,250	----------	-------	-------
1:10.5	4,840	8.0	51	5.0	15.2	9.3	(?)	2:1,000	2:550	4	35
1:10.5 1:8.8	5,260	8.0	55	5.0	17	9.2	(?)	2:1,100	2:550	4	35
1:10.5 1:8.8	5,800	8.0	50	5.0	16.5	8.5	(?)	2:1,100	2:550	4	35
1:10.5	6,620	8.0	60	5.0	16.6	9.1	(?)	2:1,100	2:550	4	35
1:10.5	3,980	8.0	115	5.0	16.0	10.6	(?)	2:1,150	2:630	4	35
1:10.5	4,610	7.0	83	4.0	10.6	8.0	40	2:450	2:450	4	35
1:10.5 1:8.8	7,630	8.0	56	5.0	16.8	9.1	(?)	2:1,200	2:550	4	35
2:10.5	7,760	8.0	56	5.0	15.6	8.6	45	2:1,200	2:550	4	35
1:10.5 1:8.8	3,800	8.0	50	5.0	16.8	8.6	45	2:1,200	2:550	4	35
1:10.5 1:8.8	4,860	8.0	45	5.0	16.5	8.8	45	2:1,200	2:550	4	35
1:10.5 1:8.8	3,900	8.0	50	5.0	16.4	8.5	45	2:1,200	2:550	4	35
1:10.5	5,860	8.0	35	4.5	16.0	8.5	30	2:1,200	2:550	4	35
1:15	6,080	8.0	60	4.5	14.7	7.1	30	2:1,200	2:600	4	36
1:15	5,520	8.0	60	4.5	14.7	7.1	30	2:1,200	2:600	4	36
1–2:15	2,780	8.0	50	4.5	18.0	8.5	30	2:1,700	2:890	4	42
1–2:15	2,780	8.0	50	4.5	18.0	8.5	30	2:1,700	2:890	4	42
1:15	2,780	8.0	50	4.5	18.0	8.5	30	2:1,700	2:890	4	42
2:15	4,000	8.0	53	4.5	17.7	8.1	30	2:1,750	2:890	6	[1] 56
2:15	5,400	6.0	70	4.5	17.5	8.5	30	2:3,000	2:1,300	6	56
2:15	13,130	5.5	65	3.0	12.4	5.3	(?)	2:400	2:400	6	50
1–2:15	4,950	8.0	55	5.0	16.0	9.0	35	2:1,200	2:550	4	35
1–2:15	2,900	8.0	62	4.5	16.2	8.2	45	2:1,200	2:55	4	35
2:15	5,300	6.0	70	4.5	17.5	8.5	30	2:3,000	2:1,300	6	56
1:10.5	2,900	8.0	60	4.5	16.0	9.0	30	2:1,200	2:550	4	35
1:15	(?)	(?)	90	4.5	18.0	9.5	30	2:1,750	2:890	4	42
1:10.5	5,860	8:0	60	4.5	16.2	8.5	30	2:1,450	2:550	4	35
1:5	950	9.7	76	3.3	14.2	7.3	67	2:45	2:190	3	18
1 MG	1,650	5.0	45	4.0	6.7	6.0	22	1:60	1:120	1	13
1 MG	1,650	5.0	45	4.0	6.7	6.0	22	1:60	1:120	1	13

[1] Prize crew of 1 officer and 20 men.

Submarine No.	Contract awarded date	Commissioned date	Displacement		Torpedoes and mines				
					Torpedoes			Mines	
			Surface (tons)	Submerged (tons)	Above water	Submerged	Caliber	Tubes	Number
B-18-47	April, 1915	July, 1915, November, 1915.	260	290	.....	2B	4:50	.....	.....
B-48-71	May, 1916	June, 1917, November, 1917.	510	650	.....	4B 1S	10:50	.....	.....
B-72-87	September, 1916	September, 1917, December, 1917.	520	650	.....	4B 1S	10:50	.....	.....
B-88-132	February, 1917	December, 1917, July, 1918	510	640	.....	4B 1S	10:50	.....	.....
B-133-141	June, 1917	Not commissioned	530	660	.....	4B 1S	10:50	.....	.....
B-142-169	....do	....do	530	660	.....	4B 2S	10:50	.....	.....
B-170-205	December, 1917	....do	540	670	.....	4B 2S	10:50	.....	.....
B-206-249	June, 1918	....do	550	670	.....	4B 2S	10:50	.....	.....
C-1-15	November, 1914	April, 1915, July, 1915	168	183	.....	.....	.....	6	12
C-16-33	August, 1915	June, 1916, September, 1916.	410	490	2B	1S	7:50	6	18
C-34-48	November, 1915	September, 1916, November, 1916.	420	500	2B	1S	7:50	6	18
C-49-79	January, 1916	November, 1916, June, 1917, 16 boats.	420	500	2B	1S	7:50	6	18
C-80-118	June, 1917	July, 1918, October, 1918.	480	560	2B	1S	7:50	6	14
C-119-192	December, 1917	Not commissioned	510	580	2B	1S	7:50	5	14
F-1-92	....do	....do	360	380	.....	4B [2] 1S	7:50	.....	.....

[2] Mine tube.

NOTE.—B means bow tube; S, stern tubes.

Guns' caliber cm.	Cruising radius				Speed in knots		Diving time (seconds)	Engines		Complement	
	Surface		Submerged		Surface	Submerged		Surface horsepower	Submerged horsepower	Officers	Crew
	Miles	Knots	Miles	Knots							
1:5 / 1:8	5,700	6.0	45	4.0	9.2	5.8	32	2:140	2:140	2	21
1:8.8 / 1:10.5	4,200	6.0	55	4.0	13.4	7.8	30	2:550	2:380	3	31
1:8.8 / 1:10.5	4,000	6.0	50	4.0	13.4	7.7	30	2:550	2:380	3	31
1:8.8 / 1:10.5	3,500	6.0	55	4.0	13.5	7.5	30	2:550	2:380	3	31
1:10.5	4,240	6.0	50	4.0	12.5	7.5	30	2:550	2:380	3	31
1:10.5	3,400	6.0	50	4.0	12.5	7.5	30	2:530	2:380	3	31
1:10.5	3,700	6.0	50	4.0	21.5	7.5	30	2:530	2:380	3	31
1:10.5	3,400	6.0	50	4.0	12.5	7.5	30	2:530	2:380	3	31
1 MG	850	5.0	50	4.0	6.4	5.5	23	1:90	1:175	1	13
1:8.8	6,910	7.0	55	4.0	11.5	6.9	40	2:250	2:230	3	23
1:8.8	7,100	7.0	55	4.0	11.7	6.9	40	2:250	2:230	3	23
1:8.8	8,000	7.0	59	4.0	12.0	7.2	33	2:300	2:310	3	23
1:10.5	8,200	7.0	40	4.5	11.5	6.6	15	2:300	2:310	3	29
1:10.5	8,200	7.0	40	4.5	11.5	6.6	30	2:400	2:310	3	29
1:8.8	3,500	-------	64	4.0	11.0	7.0	15	2:300	2:300	2	28

Number of submarines in active service

Month	Submarine cruisers				North Sea				Adriatic			
	A	B	C	D	A	B	C	D	A	B	C	D
August, 1914						14	4	18				
September, 1914					2	18	2	22				
October, 1914					5	11	5	21				
November, 1914					3	9	9	21				
December, 1914					3	11	7	21				
January, 1915					3	12	5	20				
February, 1915						14	7	21				
March, 1915					6	4	12	22				
April, 1915					6	4	13	23				
May, 1915					7	7	11	25				
June, 1915					7	4	14	25				
July, 1915					4	8	12	24				
August, 1915					10	2	8	20				
September, 1915					2	5	8	15				
October, 1915					2	2	7	11				
November, 1915					1	5	3	9	3	5	5	13
December, 1915						6	4	10	4	1	3	8
January, 1916						4	7	11	3		5	8
February, 1916						2	10	12	2		6	8
March, 1916					3	3	8	14	2	1	5	8
April, 1916					6	5	6	17	5	1	2	8
May, 1916					3	4	17	24		4	5	9
June, 1916					6	2	19	27	3	1	8	12
July, 1916					17	5	9	31	3		10	13
August, 1916					5	9	17	31	7	2	5	14
September, 1916					8	21	11	35	4		8	12
October, 1916					8	12	17	37	6	1	7	14
November, 1916					9	6	23	38	7		10	17
December, 1916					14	4	24	42	7	2	9	18
January, 1917					12	12	21	45	5		20	25
February, 1917					23	6	20	49	5	2	17	24
March, 1917					27	4	28	59	6	3	17	26
April, 1917					21	10	30	61	13	1	11	25
May, 1917	1			1	18		40	58	8		18	26
June, 1917	1			1	27	5	28	60	15		12	27
July, 1917	1			1	20	6	30	56	8	1	19	28
August, 1917	1			1	25	5	27	57	9		18	27
September, 1917	1		1	2	29	6	27	62	9		20	29
October, 1917	1		1	2	31	6	24	61	13		19	32
November, 1917	1	2	1	4	10	2	43	55	7	1	21	24
December, 1917	3	1	1	5	27	3	26	56	12	1	21	34
January, 1918	4	1	1	6	16	8	35	59	5		28	33
February, 1918	4	1	2	7	25	8	22	55	14	1	18	33
March, 1918	6	1		7	13		42	55	9		24	33
April, 1918	5	1	1	7	22		33	55	9	1	24	34
May, 1918	4		4	8	27		28	55	16		18	34
June, 1918	1	3	5	9	15		34	49	9		19	28
July, 1918	4	2	3	9	22	1	33	56	11		18	29
August, 1918	5		7	12	19		39	58	11		18	29
September, 1918	7		4	11	22		45	67	7		23	30
October, 1918	4		6	10	30		37	67	10		18	28

NOTE.—A means at sea; B, at the base; C, under repair; D, total.

on the 10th of each month during the war

Flanders				Baltic				Constantinople				Total			
A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
					2		2						16	4	20
					2		2					2	20	2	24
				3	3		6					8	14	5	27
					6	1	7					3	15	10	28
				1	4	2	7					4	15	9	28
				1		6	7					4	12	1	27
				1	1	4	6					1	15	11	27
					2	3	5					6	6	15	27
					1	2	3					6	5	15	26
		7	7	1	1	1	3					8	8	19	35
2	8		10	1		1	2		3		3	10	15	15	40
4	9		13	2	1		3		4		4	10	22	12	44
3	12		15		5	1	6		4		4	13	23	9	45
5	10		15	2	1	1	4	5	2	5	12	14	18	14	46
2	13	1	16	1	1	3	5	2	3	3	12	7	19	18	44
2	10	1	13	3	2	2	7					9	22	11	42
4	8	2	14		6	1	7		3	2	5	8	24	12	44
	13	1	14	1	3		4		3	1	4	4	23	14	41
5	8	1	14	1		2	3	2	1	1	4	10	11	20	41
4	12	1	17		2	2	4	2	2		4	11	20	16	47
6	10		16	2	4	1	7	1	3		4	20	23	9	52
1	12		13	2	2	4	8	1	3		4	7	25	26	58
3	9	3	15	3	3	2	8		3		3	15	18	32	65
6	8	2	16	2	5	2	9		3		3	28	21	23	72
8	7		15	1	6	4	11		3		3	21	27	26	74
10	8		18	4	3	3	10		4	1	5	21	36	23	80
	20		20	1	7	3	11	2	1	2	5	17	41	29	87
7	16	1	24	5		5	10	1	3		4	29	25	39	93
13	10	2	25		3	7	10		1	1	2	24	20	43	97
3	18	1	22			8	8		2	1	3	20	32	51	103
9	22	2	33			2	2	1	1	1	3	38	31	42	111
3	33	2	38		1	1	2		2	1	3	36	43	49	128
8	24	3	35		3		3		2	1	3	42	40	45	127
11	22	2	35	4	2	1	7		1	2	3	42	25	63	130
13	16	4	35	3	3	2	8	2		1	3	61	24	47	132
11	19	7	37	2	2	1	5			3	3	42	28	60	130
9	22	4	35	1	3	1	6			3	3	45	30	53	128
16	19	2	37	4	2		6			3	3	59	27	53	139
7	27	1	35	2	4		6	1	2	1	4	55	39	46	140
11	20	5	36	1	1	4	5			4	4	30	26	81	137
17	12	5	34	1			1			4	4	60	17	56	134
7	19	4	30					1	1	2	4	33	29	70	132
7	19	4	30							4	4	50	29	50	129
8	17	4	29					1		2	3	37	18	72	127
8	16	2	26							3	3	44	18	63	125
8	14	3	25						3		3	55	17	53	125
11	9	3	23						3		3	36	15	61	112
8	11	5	24						3		3	45	17	59	121
10	7	5	22						3		3	45	10	69	124
7	3	8	18						2		2	43	5	80	128
8		5	13					2		1	3	54		67	121

Increases and losses of the submarines during the war

Month	Number in commission	Lost	Interned	Month	Number in commission	Lost	Interned
August, 1914	3	2		November, 1916	11	5	
September, 1914	3			December, 1916	15	3	
October, 1914	1			January, 1917	6	2	
November, 1914	2	1		February, 1917	4	1	
December, 1914	2	2		March, 1917	4	3	1
January, 1915	2	2		April, 1917	5	2	
February, 1915	1			May, 1917	5	7	
March, 1915	7	3		June, 1917	8	2	
April, 1915	6	1		July, 1917	11	6	1
May, 1915	8			August, 1917	12	5	
June, 1915	6	1		September, 1917	8	13	
July, 1915	5	3		October, 1917	13	5	
August, 1915	2	3		November, 1917	5	7	
September, 1915	2	2		December, 1917	6	9	
October, 1915	2	1		January, 1918	3	9	
November, 1915	2	1	1	February, 1918	6	3	
December, 1915	6			March, 1918	8	5	1
January, 1916	3			April, 1918	8	7	
February, 1916	5			May, 1918	10	14	2
March, 1916	9	2		June, 1918	12	3	
April, 1916	8	3		July, 1918	9	6	
May, 1916	9	3		August, 1918	8	7	
June, 1916	8	1		September, 1918	10	7	
July, 1916	9	3		October, 1918	11	7	
August, 1916	10	1		November, 1918		1	1
September, 1916	10	1					
October, 1916	11	1		Total	343	178	7

When bases abandoned, 14 submarines were blown up.
Total of losses, 199.

LIST OF SUBMARINE LOSSES

REMARKS

1. This list contains a few uncertainties in spite of being checked as far as possible against English data. These may probably never be cleared up.

2. * means killed in action. # means taken prisoner.

3. In addition to the boats sunk during this submarine campaign, six were interned (these were either stranded or so severely damaged that they could not reach their home ports).

4. According to official data a seventh submarine was interned and 14 others were blown up when bases were abandoned.

5. The total number of submarine losses included 178 (in this list) plus 6 plus 15, equals 199.

No.	Submarine	Commanding officer	Date	Place	Cause
1	U-5	Lieut. J. Lemmer*	Dec. —, 1914	English Channel	Mine (probably).
2	U-6	Lieut. R. Lepsius*	Sept. 15, 1915	North Sea	English submarine E-16.
3	U-7	Lieut. Georg Konig*	Jan. 21, 1915	Dutch coast	Trap.
4	U-8	Lieut. A. Stoch#	Mar. 4, 1915	English Channel	English destroyer.
5	U-10	Lieut. F. Stuhr*	June 6, 1916	Baltic	Probably mine.
6	U-11	Lieut. F. Suchodoletz*	Dec. —, 1914	English Channel	Do.
7	U-12	Lieut. Kratzsch*	Mar. 10, 1915	English coast	English destroyer.
8	U-13	Lieut. Count A. von Schweinitz*.	Aug. —, 1914	North Sea	Missing.
9	U-14	Lieut. M. Hammerle*	June 5, 1915	Peterhead	Fight with English fishing vessel.
10	U-15	Lieut. R. Pohle*	Aug. —, 1914	North Sea	Rammed by English destroyer.
11	U-18	Lieut. v. Hennig#	Nov. 23, 1914	Scapa Flow	Rammed by English patrol; sunk by own crew.
12	U-20	Lieut. W. Schwieger	Nov. 5, 1916	Jutland	Stranded and blown up.
13	U-23	Lieut. Schulthess#	July 20, 1915	Fair Island	English submarine C-27 (trap).
14	U-26	Lieut. v. Berckheim*	Aug. —, 1915	Baltic	Probably mine.
15	U-27	Lieut. B. Wegener*	Aug. 19, 1915	Irish coast	English auxiliary cruiser Baralong.
16	U-28	Lieut. Georg Schmidt*	Sept. 2, 1917	Murman coast	Sunk by explosion of munition steamer.
17	U-29	Lieut. O. Weddigen*	Mar. 18, 1915	Pentland Firth	Rammed by English battleship.
18	U-31	Lieut. S. Wachendorff*	Jan. —, 1915	English east coast	Probably mine.
19	U-32	Lieut. Albrecht#	May 8, 1918	Western Mediterranean.	Depth charges from English destroyer.
20	U-34	Lieut. J. Klasing*	Nov. 9, 1918	do	Do.
21	U-36	Lieut. E. Gräff#	July 24, 1915	Northwest coast Scotland.	English Submarine trap.
22	U-37	Lieut. E. Wilcke*	Apr. —, 1915	English Channel	Probably submarine trap.
23	U-40	Lieut. G. Fürbringer#	June 23, 1915	Aberdeen	English submarine C-24 trap.
24	U-41	Lieut. K. Hansen*	Sept. 24, 1915	Scilly Island	English submarine trap.
25	U-44	Lieut. P. Wagenführ*	Aug. 12, 1917	North Sea	Probably rammed.
26	U-45	Lieut. R. Sittenfeld*	Sept. 12, 1917	do	Torpedoed by English submarine D-7.
27	U-48	Lieut. C. Edeling*	Nov. 24, 1917	Goodwin Shoals	Stranded and blown up.
28	U-49	Lieut. R. Hartmann*	Sept. 11, 1917	Atlantic	Rammed by patrol.
29	U-50	Lieut. G. Berger*	Sept. —, 1917	North Sea	Probably mined.
30	U-51	Lieut. W. Rumpel*	July 14, 1916	Helgoland Bight	Torpedoed by English submarine H-5
31	U-56	Lieut. H. Lorenz*	Nov. 2, 1916	Artic Ocean	Gunfire from Russian patrol.
32	U-58	Lieut. G. Amberger#	Nov. 17, 1917	South coast Ireland.	By depth charges, American destroyers.
33	U-59	Lieut. von Fircks*	May 14, 1917	Horn Reef	German mine.
34	U-61	Lieut. Dieckmann*	Mar. 26, 1918	Irish Sea	Depth charges. English patrol.
35	U-64	Lieut. R. Moraht#	June 17, 1918	West of Sicily	Rammed, depth charges, and gunfire from English patrol.
36	U-66	Lieut. G. Muhle*	Oct. —, 1917	North Sea	Fight with English destroyer and submarine.
37	U-68	Lieut. L. Güntzel*	Mar. 22, 1916	South coast Ireland.	Submarine trap.
38	U-69	Lieut. E. Wilhelms*	July 12, 1917	North Sea	Probably depth charges.
39	U-74	Lieut. E. Weisbach*	May 27, 1916	Aberdeen	Gunfire from English fishing vessel.
40	U-75	Lieut. Schmolling	Dec. 13, 1917	Terschelling	Mine.
41	U-76	Lieut. W. Bender	Jan. 21, 1917	Artic Ocean	Rammed by English steamer and sunk by own crew.
42	U-77	Lieut. E. Gunzel*	July 7, 1916	East coast of England.	Gunfire from English fishing vessel.
43	U-78	Lieut. J. Volbrecht*	Oct. 28, 1918	Hoofden	Torpedoed by English submarine G-2.
44	U-81	Lieut. R. Weisbach#	May 1, 1917	West coast England.	Gunfire from English fishing vessel.
45	U-83	Lieut. B. Hoppe*	Feb 17, 1917	South coast Ireland.	Submarine trap.
46	U-84	Lieut. W. Röhr*	Jan. 26, 1918	Irish Sea	Rammed.
47	U-85	Lieut. W. Petz*	Mar. 12, 1917	English Channel	English submarine trap.
48	U-87	Lieut. Count von Spetch-Schulzburg*.	Dec. 25, 1917	Irish Sea	Rammed by patrol and destroyed by depth charges.
49	U-88	Lieut. W. Schwieger*	Sept. —, 1917	North Sea	Probably mine.
50	U-89	Lieut. W. Bauck*	Feb. 12, 1918	North coast Ireland.	Rammed by English cruiser.
51	U-92	Lieut. G. Ehrlich*	Sept. 9, 1918	North Sea	Mine.
52	U-93	Lieut. H. Gerlach*	Jan. 7, 1918	English Channel	Rammed.
53	U-95	Lieut. A. Prinz*	Jan. —, 1918	do	Unknown.
54	U-99	Lieut. M. Eltester*	June —, 1917	North Sea	Rammed (?).
55	U-102	Lieut. K. Beitzen*	Sept. —, 1918	do	By mine.
56	U-103	Lieut. C. Rücker#	May 12, 1915	English Channel	Rammed.
57	U-104	Lieut. K. Bernis*	Apr. 25, 1918	South coast of Ireland.	Rammed by destroyer and destroyed by depth charges.
58	U-106	Lieut. H. Hufnagle*	Oct. —, 1917	North Sea	Fight with English destroyer and submarine.

No.	Submarine	Commanding officer	Date	Place	Cause
59	U-109	Lieut. Otto Ney*	Jan. 26, 1918	English Channel	Gunfire.
60	U-111	Lieut. K. Kroll*	Mar. 15, 1918	North coast of Ireland.	Depth charges, English destroyer.
61	U-154	Lieut. H. Gercke*	May 11, 1918	Gibraltar	Torpedoed by English submarine H-35.
62	U-156	Lieut. R. Feldt*	Sept. 25, 1918	North Sea	Mine.
63	UB-3	Lieut. S. Schmidt*	May —, 1915	Mediterranean	Unknown.
64	UB-4	Lieut. Carl Gross*	Aug. 15, 1915	North Sea	English fishing vessel.
65	UB-7	Lieut. H. Lütjohann*	Oct. —, 1916	Black Sea	Probably mine.
66	UB-12	Lieut. E. Schoeller*	Jan. 8, 1918	Hoofden	Mine.
67	UB-13	Lieut. A. Metz*	Apr. 24, 1916	English Channel	Caught in submarine net; destroyed by depth charges.
68	UB-16	Lieut. Von B. Lühe#	May 10, 1918	East coast of England.	Torpedoed by English submarine E-34.
69	UB-17	Lieut. A. Branscheid*	Mar. —, 1918	Hoofden?	Depth charges, English destroyer (?)
70	UB-18	Lieut. G. Niemeyer*	Dec. —, 1917	English channel	Probably mine.
71	UB-19	Lieut. E. Roodt#	Nov. 30, 1916	do	Submarine trap.
72	UB-20	Lieut. H. Glimpf*	July 29, 1917	Flanders coast	Aircraft bombs.
73	UB-22	Lieut. K. Wacker*	Jan. 29, 1918	German Bight	Mine.
74	UB-26	Lieut. W. Smiths#	Apr. 5, 1916	Le Havre	Caught in submarine net and sunk.
75	UB-27	Lieut. Count von Stein*	July 29, 1917	Hoofden?	Rammed by English gunboat and destroyer depth charge.
76	UB-29	Lieut. E. Platsch*	Dec. 6, 1916	Scilly Islands	Bombs from English destroyer.
77	UB-30	Lieut. R. Stier*	Aug. 13, 1918	Hoofden?	Depth charges English fishing vessel.
78	UB-31	Lieut. Res. Braun*	May 2, 1918	North Sea	Depth charges English patrol
79	UB-32	Lieut. B. von Ditfurth*	Sept. —, 1917	English Channel	Unknown.
80	UB-33	Lieut. Fritz Gregor*	Apr. 11, 1918	do	Mine.
81	UB-35	Lieut. Carl Stöter	Jan. 26, 1918	do	Depth charges, English destroyer.
82	UB-36	Lieut. von Keyserlinck*	May —, 1917	do	Probably submarine trap.
83	UB-37	Lieut. P. Günther*	Jan. 14, 1917	do	Gunfire and depth charges.
84	B-38	Lieut. G. Bachmann*	Feb. 8, 1918	do	Mines.
85	B-39	Lieut. H. Keüstner*	May 17, 1917	do	Submarine trap.
86	B-41	Lieut. Max Ploen*	Oct. 2, 1917	East coast England.	Mine.
87	B-44	Lieut. Franz Wäger*	Sept. 1, 1916	Otranto Straits	Unknown.
88	B-45	Lieut. C. Palis*	Nov. 6, 1916	Near Varna	Mine.
89	B-46	Lieut. C. Bauer*	Dec. 7, 1916	Bosphorus	Do.
90	B-52	Lieut. Launburg#	May 23, 1918	Otranto Straits	English submarine H-4.
91	B-53	Lieut. Sprenger#	Aug. 3, 1918	do	Mine net.
92	B-54	Lieut E. Hecht*	Mar. 11, 1918	English Channel	English destroyer.
93	B-55	Lieut. S. Wenninger#	Apr. 22, 1918	do	Mine.
94	B-56	Lieut. Valentiner*	Dec. 19, 1918	do	Do.
95	B-57	Lieut. J. Loss*	Aug. 14, 1918	Zeebrugge	Do.
96	B-58	Lieut. Löwe	Mar. 10, 1918	English Channel	Do.
97	B-61	Lieut. T. Schultz*	Nov. 29, 1917	German Bight	Do.
98	B-63	Lieut. Gebeschus*	Jan. 28, 1918	North Sea	Depth charges, English fishing vessels.
99	B-65	Lieut. M. Schelle*	July 10, 1918	Cape Clear	Fight with submarine trap.
100	B-66	Lieut. F. Wernicke*	Jan. 18, 1918	Aegean near Malta.	Depth charges, fight with
101	B-68	Lieut. Dönitz#	Oct. 4, 1918	do	English destroyer and fishing vessel.
102	B-69	Lieut. Alfred Klatt*	Jan. 8, 1918	Mediterranean	Depth charges English submarine chasers.
103	B-70	Lieut. J. Remy*	May 8, 1918	do	Depth charges. American English patrols vessels.
104	B-71	Lieut. K. Schatler*	Apr. 2, 1918	Straits of Gibralter	Do.
105	B-72	Lieut. F. Träger*	May 12, 1918	English Channel	Torpedoed by English submarine D-4.
106	B-74	Lieut Ernst Steindorf*	May 26, 1918	do	Depth charges, English patrol.
107	B-75	Lieut. F. Walther*	Dec. 10, 1917	English coast	Mine nets.
108	B-78	Lieut. Stossberg*	May 9, 1918	English Channel	Rammed and depth charges
109	B-81	Lieut. Saltzwedel*	Dec. 2, 1917	do	Mine!
110	B-82	Lieut. W. Becker*	Apr. 17, 1918	North coast Ireland.	Gunfire and depth charges. English fishing vessels.
111	B-83	Lieut. Buntebardt*	Sept. 10, 1918	Pentland Skerries	Depth charges.
112	B-85	Lieut. Krech#	Apr. 30, 1918	Irish Sea	Gunfire from English fishing vessels.
113	B-90	Lieut. von Mayer*	Oct. 16, 1918	North Sea	Torpedoed by English submarine L-12.
114	B-103	Lieut. Hundius*	Sept. 16, 1918	English Channel	Depth charges, English airship, and fishing vessels
115	B-104	Lieut. Bieber*	Sept. 19, 1918	North Sea	Mine.
116	B-107	Lieut. von Prittwitz u. Graffon.*	July 27, 1918	Hoofden?	Depth charges, English destroyer and fishing vessels.
117	B-108	Lieut. W. Amberger*	July —, 1918	English Channel	Unknown.
118	B-109	Lieut. Ramien*	Aug. 29, 1918	English Channel	Mine.
119	B-110	Lieut. Fürbringer#	July 9, 1918	Hoofden	Rammed by English destroyer.
120	B-113	Lieut. Pilzercker*	Sept. —, 1918	English Channel	Unknown.

No.	Submarine	Commanding officer	Date	Place	Cause
121	B–115	Lieut. Reinhold Thomsen.*	Sept. 29, 1918	East coast England.	Depth charges, English destroyer.
122	B–116	Lieut. Emsmann*	Oct. 28, 1918	Scapa Flow	Mine.
123	B–119	Lieut. W. Kolbe*	May —, 1918	North Sea	Unknown.
124	B–123	Lieut. R. Ramm*	Oct. 19, 1918	do	Mine.
125	B–124	Lieut. Wutsdorff#	July 20, 1918	North Channel	Depth charges and gunfire, English destroyer.
126	B–127	Lieut. Scheffler*	Sept. —, 1918	North Sea	Mine.
127	C–1	Lieut. Mildenstein*	July 25, 1917	English Channel	Aircraft bombs.
128	C–2	Lieut. Karl Mey*	July 2, 1915	Yarmouth	Rammed by English merchant steamer.
129	C–3	Lieut. Kreysern*	May —, 1916	Flanders	Probably mines and nets.
130	C–5	Lieut. Mohrbutter#	Apr. 27, 1916	English east coast	Stranded and blown up.
131	C–6	Lieut. Reichenbach*	Sept. 28, 1917	English Channel	Aircraft bombs.
132	C–7	Lieut. Georg Haag*	July 6, 1916	do	Depth charges from submarine chasers.
133	C–9	Lieut. Schürmann*	Oct. —, 1915	do	Probably explosion of own mines.
134	C–10	Lieut. W. Albrecht*	Aug. 21, 1916	Maas lightship	Torpedoes by English submarine E–54.
135	C–11	Lieut. Kurt Utke#	June 26, 1918	Hoofden	Mine.
136	C–12	Lieut. E. Fröhner*	Mar. 16, 1916	Harbor of Tarent	Do.
137	C–13	Lieut. Kirchner	Nov. 29, 1915	Black Sea	Stranded and blown up by gunfire, Russian destroyer.
138	C–14	Lieut. Feddersen*	Oct. 3, 1917	Flanders coast	Mine.
139	C–15	Lieut. Bruno Heeler*	Nov. —, 1916	Sulina (Black Sea)	Probably mine.
140	C–16	Lieut. Reimarus*	Oct. 23, 1917	English Channel	Bombs from English destroyer.
141	C–18	Lieut. W. Kiel*	Mar. 12, 1917	do	English destroyer (uncertain).
142	C–19	Lieut. A. Nitzsche*	Dec. 4, 1916	do	Depth charges, English destroyer.
143	C–21	Lieut. von Zerboni di Sposetti*	Sept. 27, 1917	Downs	Nets and mines (?).
144	C–24	Lieut. Willich*	May 24, 1917	Cattaro	Torpedoed by French submarine Circe.
145	C–26	Lieut. Count von Schmettow.#	May 9, 1917	Mouth of Thames	Rammed by English destroyer and depth charges.
146	C–29	Lieut. Rosenow*	June 7, 1917	Southwest Ireland	Submarine trap.
147	C–30	Lieut. H. Stenzler*	Apr. 9, 1917	North Sea	Mine.
148	C–32	Lieut. H. Breyer#	Feb. 23, 1917	English east coast	Do.
149	C–33	Lieut. A. Arnold#	Sept. 26, 1917	Irish Sea	Caught in submarine net and rammed.
150	C–35	Lieut. Korsch*	May 16, 1918	West coast Italy	Gunfire from patrol.
151	C–36	Lieut. Gustav Buch*	May 20, 1917	English Channel	Aircraft bomb.
152	C–38	Lieut. Wendlandt#	Dec. 14, 1917	Agean	Gunfire and depth charges.
153	C–39	Lieut. Ehrentraut*	Feb. 8, 1917	North Sea	Gunfire and depth charges. English destroyer.
154	C–41	Lieut. Hans Foerste*	Aug. 21, 1917	English east coast	Depth charges, English fishing vessel.
155	C–42	Lieut. Hans Müller*	Sept. 10, 1917	South coast Ireland	Explosion of own mines.
156	C–43	Lieut. Sebelin*	Mar. 10, 1917	Shetland Island	Torpedoed by English submarine G–13.
157	C–44	Lieut. Tebbenjohanns	Aug. 5, 1917	South coast Ireland	Depth charges, submarine chasers.
158	C–46	Lieut. Fritz Moecke*	Feb. 8, 1917	English Channel	Rammed by English destroyer and depth charges.
159	C–47	Lieut. Wigankow*	Nov. 18, 1917	Hoofden	Rammed by English patrol.
160	C–49	Lieut. Kükenthal*	Aug. 8, 1918	Probably Hoofden	Unknown.
161	C–50	Lieut. R. Seuffer*	Feb. 4, 1918	English Channel	Depth charges, English destroyer.
162	C–51	Lieut. Hans Galster*	Nov. —, 1917	Unknown	Unknown.
163	C–55	Lieut. von Lilienstern*	Sept. 29, 1917	Lerwick	Damaged and sunk by gunfire, English destroyer.
164	C–57	Lieut. Wissman*	Nov. —, 1917	Bay of Finland	Probably mine.
165	C–61	Lieut. Georg Gerth#	July 26, 1917	Off Calais	Stranded and burned up by own crew.
166	C–62	Lieut. Max Schmitz*	Oct. 10, 1917	English Channel	Uncertain.
167	C–63	Lieut. von Heydebreck*	Nov. 1, 1917	Dover Straits	Torpedoed by English submarine E–52.
168	C–64	Lieut. F. Schwartz*	June 20, 1918	English Channel	Mine.
169	C–65	Lieut. Lafrenz#	Nov. 3, 1917	do	Torpedoed by English submarine C–15.
170	C–66	Lieut. Pustkuchen*	June 12, 1917	do	Depth charges, English fishing vessel.
171	C–68	Lieut. Degetau*	Apr. 5, 1917	Flanders	Torpedoed by English submarine C–7.
172	C–69	Lieut. Thielmann	Dec. 6, 1917	Barfleur	Rammed (accident).
173	C–70	Lieut. Dobberstein*	Aug. 28, 1918	Hoofden	Depth charges, English control.
174	C–72	Lieut. Ernest Voigt*	Sept. 22, 1917	English Channel	Aircraft bomb.
175	C–75	Lieut. W. Schmitz#	May 31, 1918	East coast England	Ramming and gunfire, English destroyer.
176	C–77	Lieut. J. Reis*	Sept. —, 1918	English Channel	Probably depth charges, English fishing vessel.
177	C–78	Lieut. Hans Kukat*	May 2, 1918	do	Do.
178	C–79	Lieut. Kraymer*	Apr. —, 1918	do	Uncertain.

Remarks.—The sinkings reported by the submarines during the war have been compared with the White Books of the Foreign States, as well as with Lloyds Register, in order to establish the exact tonnage of all vessels sunk, as well as to identify those ships which were reported as unknown. In this we were not entirely successful. In some cases the submarines have reported vessels sunk which do not appear in the list given in the White Book, as they were towed into port and repaired in the meantime. On the other hand, about one-half a million tons of shipping which was actually sunk, could not be included in these lists as the submarines responsible for the sinking did not return to port. On the whole there is a certain difference between the report which is in favor of the submarines report.

Finally there is a great difference in the reported loss of shipping resulting from mines, since these were not based on submarine reports, but were taken from newspapers and other sources. Later in the war the sinkings due to mines had to be estimated from previous experience. In this there is a considerable difference in our favor between the assumption and the fact.

But even these reports can not be considered as absolutely definite since even the foreign lists are incomplete and report only losses "as far as it is known." Thus, these lists do not include the smaller vessels which may have been torpedoed, stranded, or else otherwise damaged, and which have been placed in service again after the end of the war.

It is especially noteworthy that during the war our reported sinkings given out by the naval staff and based on the reports of the submarine commanders should check very closely, while to-day there is a rather large difference in our favor.

On the whole we must assume that the figures given are rather too small and that they represent in each case the minimum success achieved by our submarines. Other calculations on the sinkings are not available.

Submarine successes in the war

(In gross registered tons)

Year and month	Enemy merchant ships sunk		Neutral merchant ships sunk	
	Torpedoes	Mines	Torpedoes	Mines
1914				
August	----------	3,852	----------	17,150
September	----------	4,191	----------	5,696
October	866	20,164	----------	4,031
November	2,084	6,500	----------	3,420
December	419	15,997	----------	16,013
Total	3,369	50,704	----------	46,310
1915				
January	17,577	9,839	----------	3,181
February	22,785	7,954	----------	6,514
March	87,691	8,435	1,826	4,564
April	32,941	2,068	7,698	13,781
May	96,250	7,875	11,336	23,863
June	96,048	12,270	19,243	9,594
July	83,332	17,737	14,499	5,928
August	157,162	15,642	17,361	6,627
September	124,881	33,873	5,297	22,738
October	72,522	40,757	2,508	8,810
November	167,889	38,926	6,425	9,032
December	88,719	34,643	3,744	13,982
Total	1,047,797	230,019	89,937	128,704
1916				
January	45,564	12,157	----------	15,017
February	49,801	89,376	1,266	15,005
March	148,959	46,483	9,473	32,071
April	176,995	40,207	12,447	24,509
May	86,673	26,272	17,709	3,835
June	81,725	12,311	2,191	22,238
July	99,162	13,517	5,450	7,023
August	139,124	12,275	28,136	6,279
September	141,301	51,739	79,424	5,277
October	231,233	77,667	81,434	22,337
November	177,607	133,136	94,952	21,922
December	204,692	97,302	93,798	25,380
Total	1,582,836	612,442	426,280	200,974
1917				
January	203,751	97,135	104,329	30,908
February	505,201	119,672	121,297	25,228
March	484,043	129,186	158,138	29,544
April	772,753	146,214	227,447	29,238
May	504,518	106,111	139,967	31,398
June	773,078	96,114	131,503	41,386
July	564,957	112,361	109,463	25,139
August	587,940	110,920	62,995	26,580
September	428,026	132,003	40,221	5,497
October	528,562	77,497	43,733	22,503
November	417,731	102,361	39,860	6,695
December	574,056	103,367	52,928	9,989
Total	6,344,616	1,332,941	1,231,881	284,105
1918				
January	466,943	90,033	39,763	9,967
February	455,922	81,382	32,490	18,618
March	581,366	86,061	50,138	20,478
April	530,933	93,783	20,186	8,917
May	442,256	93,816	18,265	6,184
June	298,471	93,168	30,736	10,185
July	411,955	87,560	23,180	2,440
August	326,845	83,881	37,884	3,141
September	306,932	47,836	14,399	2,164
October	167,458	5,000	7,228	5,609
Total	3,989,081	762,520	274,269	87,703
Total 1914 to 1918	12,967,699	2,988,626	2,022,367	747,796
Of these English	9,366,256	1,328,687	----------	----------

In all sunk	18,716,982
Of these English	10,694,843

List of sinkings published in the white books

War period	Number of vessels over 100 tons	Ship tonnage in British registered tons
August, 1914, to Sept. 30, 1915	431	791, 705
Oct. 1, 1915, to Apr. 30, 1916	359	898, 794
May 1, 1916, to Jan. 31, 1917	1, 152	2, 099, 523
Feb. 1, 1917, to Dec. 31, 1917	2, 566	5, 753, 751
Jan. 1, 1918, to end of war	1, 046	2, 648, 223
Total I	5, 554	12, 191, 996

Sinkings according to Lloyd's Register

War period	Number of vessels over 100 tons	Ship tonnage in British registered tons
1914	162	372, 277
1915	726	1, 438, 173
1916	1, 187	2, 328, 688
1917	2, 734	6, 350, 362
1918	1, 052	2, 744, 172
Total II	5, 861	13, 233, 672
Total I	5, 554	12, 191, 996
Excess according to Lloyds	307	1, 041, 676

REMARKS.—The increase in sinkings given by Lloyd's must be directly attributed to the effects of the submarine warfare; further, the activities of our cruisers as well as other causes indicates that this total is very nearly correct.

Distributions of sinkings amongst the various theaters of war

Group	Number of vessels	Tonnage
North Sea	2, 364	5, 154, 605
Flanders	1, 599	2, 054, 249
Mediterranean	1, 409	3, 286, 462
Baltic	19	11, 626
Reported but not distributed	326	511, 923
Total	6, 520	12, 243, 090

Results of sinkings in the order of the most successful submarine commanders during the war, based on minimum results

No.	Name and rank	Submarine No.	Number of undertakings	Definitely proven sinkings (tonnage)
1	Lieut. von Arnauld de la Periere	35, 139	10	400, 000
2	Lieut. W. Forstmann	39	16	380, 000
3	Lieut. Max Valentiner	38, 157	17	300, 000
4	Lieutenant Rose	53	12	210, 000
5	Lieut. Otto Steinbrinck	B–10, 18, 57, C–65	24	210, 000
6	Lieutenant Kophamel	35, 151, 140	10	190, 000
7	Lieutenant Schweiger	20, 88	12	190, 000
8	Lieut. Hans von Mellenthin	B–43, 49	11	170, 000
9	Lieutenant Rücker	34, 103	14	170, 000
10	Lieutenant Wunsche	25, 70, 97	12	160, 000
11	Lieutenant Saltzwedel	B–10, 81, C–21, 71	12	150, 000
12	Lieutenant Steinbauer	B–47, 48	10	140, 000
13	Lieutenant Gansser	33, 156	8	140, 000
14	Lieut. Robert Moraht	64	9	130, 000
15	Lieut. Wilhelm Werner	55	10	130, 000
16	Lieut. Leo Hillebrand	16, 46	12	130, 000
17	Lieut. Otto Schultze	63	6	130, 000
18	Lieut. Rudolf Schneider	24, 87	10	130, 000
19	Lieut. Ernst Hashagen	62	8	130, 000
20	Lieutenant Hartwig	32, 63	10	130, 000

Further, the following sank over 100,000 tons shipping:

Lieutenant Marschall with *UC–74*, *UB–105*.

Lieut. Ritter von Georg with *U–57*, *U–101*.

Lieutenant Jess with *U–79*, *U–96*, *U–90*.

Lieut. Raimund Weisbach with *U–19*, *U–81*.

Lieutenant Wassner with *UB–38*, *U–59*, *U–117*, *UC–69*.

Nearly 100,000 tons were sunk by the following:

Lieut. G. Berger, Lieut. A. von Glasenapp, Lieutenant Dieckmann, Lieutenant Wilhelms, Lieutenant Howaldt, Lieutenant Ramien, Lieutenant Siefs, Lieutenant Hersing, Lieut. Carl Schuster, Lieutenant Jürst, Lieutenant Viebeg, Lieut. J. Klasing, Lieutenant Loss, Lieutenant Adam, Lieutenant Biber, Lieut. R. Hartmann, Lieut. E. Krafft, Lieutenant Pustkuchen, Lieut. Karl Neumann, Lieut. Hans Valentiner.

Remarks.—The above list can not be taken as an absolute measure of the success of the commanding officers. The conditions under which they had to operate were very different. For example, in the vicinity of England in 1917 and 1918 it was frequently impossible to definitely establish a tonnage of the vessels sunk or to complete the sinking on account of the strong patrol forces. Vessels which were simply fired at are not included in this list, although frequently they were either damaged or sunk, and thereby put out of commission at least for the period of the war. A list of such vessels is, however, not available.

In addition to the above, a small slow submarine, not heavily armed, is not in the position to obtain the results achieved by the

larger, stronger submarines. Further there were differences in material, even in the same class of boats, which preclude a definite comparison.

Finally some of the established sinkings which it has not yet been possible to assign, may also be due to one or the other of the U-boats without having been entered in the above list.

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The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

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ARGENTINA

AVIATION NOTE

December, 1925

[From the Argentine press]

From next year, because of the character of instruction which will be given to the future officers of the navy in the naval school, there will be organized a course in what has been designated as the fifth arm.

Like the rest, it will figure from now on in the programs of aviation, and the knowledge of this subject will weigh equally with algebra, trignometry, history, and geography in the final examinarions which determine classifications according to the officers of the fleet. We already know that seniority also constitutes one grade. Further, the marine guards, the ensigns, in order to receive promotion must first complete a certain number of hours of flight, whereas up until now they have been required to spend so much time in loading ships, in the discharge of various commissions, and the completion of a series of exercises destined to test their aptitude and condition for the hard life of a mariner.

The higher authorities consider that aviaiton has ceased to be a voluntary service of the marines to acquire a knowledge necessary to a sea career.

BRAZIL

NEW SUBMARINE ORDERED

In conformity with the regulations of Article XVI of the Washington conference relative to naval armaments, the following statement was issued on October 22, 1925, by the chief of the general staff of the Italian Royal Navy:

By contract signed October 2, 1925, the Government of Brazil ordered to the firm Ansaldo San Giorgio, of Spezia, a submarine. Her principal characteristics are as follows:

Displacement type, surface	tons	1,368
Displacement type, surface	metric tons	1,390

Displacement type, submerged	tons	1,854
Displacement type, submerged	metric tons	1,884
Length on the water line	meters	85,925
Maximum breadth on or under the water line	do	7,800
Mean draft corresponding to the displacement type, submerged	do	4,615

The ship will be laid down within the current month of October.

BRAZIL

NAVY PERSONNEL FOR 1926

The President and Minister of Marine of Brazil have signed the following decree:

ARTICLE I. The naval forces for the administrative year of 1926 shall consist:

1. Of the officers existing in their respective classes.
2. Of the petty officers in accordance with their respective classes.
3. Of a maximum of 100 students in the naval school.
4. Of 5,500 sailors in the Corpo de Marinheiros Nacionaes, distributed in the various specialties and classes of deck and aviation.
5. Of 2,315 sailors for machinery service from the Corpo de Marinheiros Nacionaes, distributed in the various specialties and classes.
6. Of 1,500 sailors for the Naval Regiment (Regimento Naval), including a company for service at the military prison on Cobras Island for feeding and guarding the prisoners.
7. Of 1,200 students in the Escolas de Aprendizes Marinheiros (school of apprentices) and of 300 students in the Grumetes (deck or cabin boy) School.

ART. II. In time of war the naval forces shall be composed of the personnel found necessary.

ART. III. The time of service in the navy shall be:

(*a*) Two years of instruction for those drafted.

(*b*) Three years for those engaged, reengaged, and volunteers.

(*c*) Nine years for those proceeding from the Escolas de Aprendizes and Grumetes, counting from the time he is accepted as a member of the Corpo de Marinheiros Nacionaes.

ART. IV. Vacancies in the personnel of the navy can be filled by the navy school, by the apprentice seamen's school, by volunteers, and by those generally drafted to the navy under regulations approved in decree section 16460 of May 7, 1924.

ART. V. Sailors of the Corpo de Marinheiros Nacionaes and Regimento Naval who complete three years of service with good conduct shall have a bonus equal to one-half the pay of a simple sailor of the class to which they belong, without loss of any other privilege or bonus to which they have a right as a sailorman.

ARTICLE VI. Sailors of the Corpo de Marinheiros Nacionaes and Regimento Naval who at the end of three years reengage for three years more shall receive pay and a half, and those reengaging over this period shall receive double pay.

ARTICLE VII. Sailors of the Corpo de Marinheiros Nacionaes and Regimento Naval approved in the courses given of the various specialties, those fulfilling duties defined in decree 7399 of May 14, 1919, and those found among other regulations in force shall have the right to the extraordinary bonus given in addition to the advantages existing at present for them.

ARTICLE VIII. Sailors of the Corpo de Marinheiros Nacionaes and Regimento Naval enlisting or reenlisting shall receive on each enlistment the value in money of the clothing gratuitously given them on their first enlistment.

ARTICLE IX. The Marinha de Guerra embraces: (*a*) The active force; (*b*) the reserves.

The active force embraces all personnel referred to in Article I.

The reserve force constitutes the first, second, and third category of personnel, in accordance with the regulations of draft.

ARTICLE X. The executive power shall proportion the technical and practical instruction adequate to obtaining a certificate on the part of the reserves.

ARTICLE XI. Dispositions to the contrary revoked.

(Signed) ARTHUR DA SILVA BERNARDES.
(Signed) ALEXANDRINO FARIA DE ALENCAR.

RIO DE JANEIRO, *December 16, 1925.*

One hundred and fourth year of independence and thirty-seventh year of Republic.

EUROPE

DISARMAMENT NOTES

January, 1926

[Source M. I. D.]

One of the first results of the success of the Locarno conference was the release of a flood of international political energy which has found an outlet in the problem of disarmament, toward the solution of which world diplomacy has now turned.

As officially stated, "A preparatory commission for a disarmament conference, empowered with the preparation of a conference for reduction and limitation of armaments," is scheduled to be held in Geneva on February 15. If all attend who are accorded the privilege of doing so, the commission will total 19 members, including the 10 members of the league council (Great Britain, France, Italy, Japan, Czechoslovakia, Belgium, Spain, Brazil, Uruguay, and Sweden), 6 members of the League of Nations not members of the council (Bulgaria, Finland, Holland, Poland, Rumania, and Yugoslavia) who have been invited to attend, and 3 nonmembers of the league (United States, Germany, and Russia) who have also received invitations. The states unrepresented will be entitled to send memoranda on the points in which they are particularly interested. This preliminary conclave will constitute a sort of enlarged league council, with the important difference that three great powers which are thus far independent of league politics and league activities will have a voice.

The first meeting of the preparatory commission will probably last three weeks. Commencing with an exchange of views, it will proceed to consideration of the prepared program, which contains

many questions so highly technical that it will be necessary to refer them to experts. It is generally understood that the knotty problems resulting from scores of cross currents relating to disarmament can be solved only by discussion and rediscussion, such as preceded the Locarno conference. To the European nations, Britain included, disarmament is inseparable from security, and the League of Nations Assembly resolution, responsible for the composition and convocation of the preparatory commission, states expressly that the conference is to be convened as soon as satisfactory conditions have been assured from the point of view of general security. It may be necessary to call a second meeting of the preparatory commission before the assembly meets next September, and any number of sessions may be convened between the 1926 assembly of the league and the calling of the general conference, which may not be held this year and perhaps not even as early as the year 1927.

At the present moment it is difficult to even attempt a forecast of what practical results the coming disarmament conference can accomplish. A neutral observer watching the proceedings of any recent international conference could not fail to clearly discern behind each national group gathered about the table the figure of a fictitious personage, that of the individual nation which each represents. European diplomats consider this fictitious personage always as a client whose interests, taking precedence above those of all the world, it is their privilege and sacred duty to guard and whose cause alone it is theirs to plead with all the powers at their command. In regard to disarmament, the attitude has been in many cases a most self-righteous one, born of the national belief that the armed forces of the individual nation in question are never used except for the good of humanity. In consequence, why should a nation disarm in any respect except in some perfectly safe way which will work for a material financial saving? At the coming conference representatives of each and all the powers may be counted upon to view every problem presented in the light of intelligent self-interest and to make their individual decisions accordingly.

To hazard a guess at the chances of Europe doing anything substantial in the way of disarmament requires a close scrutiny of the views of various countries in regard to the question, which may well be regarded as the touchiest of all present problems and one which it may be found impossible to solve without pressure of some form, such as, for instance, Europe's need for funds and America's power to define the conditions under which she would advance them.

Briefly, the European nations line up on the disarmament problem at present in about the following manner:

The so-called neutral nations are genuinely in favor of disarmament because they do not desire to become innocent bystanders or equally innocent victims at the outbreak of the next war between their neighbors.

Poland and Rumania are in fear of Russia and want to keep their present forces.

Yugoslavia, eager to become an armed guard of peace in the Balkans and afraid of Italy's growing imperialism, is opposed to a reduction of her army.

Germany: Around the disarmament question a fateful struggle for power in Europe is beginning, wherein Germany hopes actually to reestablish her position as a great power. Germany faces two alternatives—either she can take the British standpoint and fight for a reduction by all the nations in arms to the minimum already allowed her and Austria and self-imposed upon Great Britain and the United States, whose defense is chiefly marine, or she can take up the challenge thrown down by France and demand that, in view of the responsibilities she assumed as a guarantor in signing the Locarno pact and the further obligations which she will assume on joining the league, she be allowed to readjust her armament quota in harmony with the readjustments of the other powers, even if this means an increase in her army. Germany, in this situation, is making ready to jump either way, quite frankly depending on which offers the greater advantages in achieving her real aim, which is equality among the great powers. As Professor Otto Hoetsch, one of the able, conservative leaders of the German Nationalist Party, says in a recent article, "The problem is devilishly complicated."

France, never anything if not logical, says that any further limitation of armament must mean equality of armaments. Of course she is thinking of herself in relation to the big three. She does not mean that the Chinese Navy must be on equal footing with her own. She means that with her traditions and her maritime interests she should be as strong as any other great power at sea. The simple reason why she is not now attempting to be as strong is because of her financial condition. But she clearly sees occasion to take opportunity by the hand. The other great powers must reduce their naval armaments; she will stick to what she has until they come down to her level. If the process continues beyond that stage, she too will take a hand in the game. The French military mind is subtle, with an edge that owes its sharpness to the teachings of military history. So it is now being pointed out in France that the principal disarmament difficulty is the "war potentialities of a nation," and these are not summarized in the size of armies and stocks of arms. The meaning of this is already realized by those

who say that the next war may be fought in the laboratory. There can never be any disarmament in the matter of chemists' minds. The Paris Temps of January 12 outlines the French position when it says:

> The end we are seeking is security for all nations. The sole fact of disarming does not attain this end, since disarmament can only be the result of security solidly established. It would be the play of dupes simply to decide upon proportional reduction of the military effectiveness of the various nations without taking account of the general resources, and the special means every nation may possess by reason of its population, its geographical position, its financial and economic prosperity, and its industrial development to constitute rapidly a formidable army to carry out premeditated aggression. No one nation should be able in any field to oppose successfully the League of Nations and every victim of aggression should be sure of help. If we do not mean to approach the question of disarmament in all its aspects it would be better not to discuss it at all.

Italy has not revealed her attitude upon the subject. Signor Mussolini has been making some martial speeches about the necessity for safeguarding national honor and territorial integrity, but these may be taken as political rather than strategical. It is reasonable to assume, however, that if France really should take up such a position as that outlined above, Italy will declare for the same principle. Both of these countries, since the armistice, have been following a strictly defensive policy of naval maintenance, which fact must needs materially strengthen any claim to equality in the ratio of the future.

Russia is largely an unknown quantity and derives what power she has in the world to a great extent from this factor. She has shown herself capable of defending her territory against minor incursions. Whether she could stand up under the pressure of a major war, either defensive or offensive, is a moot point, but no nation to-day is inclined to take a chance on finding out. Participation by Russia in the disarmament conference would open a whole series of unanticipated problems, as from the angle of land disarmament she would play one of the most important rôles, for she may at any day start a conflagration on the Continent of Europe. Russia is a constant menace to several nations, none of whom dare cut armaments, while at the same time strong nations like France are bound to assist Russia's neighbors in the event of attack.

Great Britain: Thanks to British guaranties, France and Germany are now safer in respect of each other than they have ever been before. Britain can not say so much for herself. She has become a guarantor without guarantees. She has made the Rhineland safe between France and Germany, but Britain has her own Rhineland, for she has ceased to be an island and is very vulner-

able from the air. Having lost all the advantages of her island position, she retains its disadvantages, for she is dependent upon overseas supplies, and in the submarine a weapon of blockade has been found that is almost useless against a continent but deadly against an island. The operative threats so far as Great Britain is concerned are French submarines and airplanes. The submarine will probably never be abolished as the adjunct of a battle fleet, though it may some time be abolished as a weapon of blockade. The submarine is regarded as the defensive weapon of the weaker naval power against the stronger, this being the justification which the French always plead for their enthusiasm for this arm. If Britain is to enjoy the increased measure of security that would enable her to disarm, it is not enough that European States should disarm as between themselves; Europe must also disarm as against Great Britain. Britain, too, needs relief from the intolerable burden of taxation and she especially needs that increased sense of security which might help her to begin large economies in the expenditure of her fighting services. Her pact of security would concern itself largely with submarines and the law of blockade. It would have much more to do with demilitarized zones in the air than on the land. Britain feels that the time has come for her to view her own disarmament problems with the most intelligent self-interest, lest she lose herself in attempting to save Europe. Yet there is abundant evidence that British experts believe that prospects for real, practical results from the coming disarmament conference are small; therefore, efforts are being directed toward postponement, rather than inviting what might be tantamount to a failure which would give the cause of disarmament a setback. Reduced to a final analysis, it is clear that Great Britain occupies the same position that she has held since the overthrow of the MacDonald Cabinet—that of blocking anything definite and burying the subject of international disarmament under a maze of indefinite "preparations."

Russia, Switzerland, and the Disarmament Conference

The boycott existing between the Swiss and Soviet Governments is being used by the latter as an excuse for deferring acceptance of the invitation of the League of Nations to the disarmament conference scheduled to be held at Geneva this spring. Present Russo-Swiss relations are of three years' standing, arising from the assassination of Vorovsky at Lausanne and the subsequent acquittal of Conradi by the Swiss courts. The Swiss Federal Council evinces a willingness to do all that is in consonance with the dignity of the nation

to prevent the Russians from using the Swiss attitude as a pretext for refusing to cooperate with the League of Nations.

Latest reports indicate a postponement of the conference for five weeks, and it is hoped that during the intervening period the breach between Switzerland and the soviet government will be satisfactorily healed.

FRANCE

MISCELLANEOUS NOTES

Schneiders's shipyard at Chalons-sur-Saone

The following from the British press:

INLAND SHIPYARD—EXTRAORDINARY ESTABLISHMENT IN HEART OF FRANCE

The recent French successes in getting submarine contracts from the Greek Navy has drawn attention to Schneiders's work in this direction. It is anticipated that the new submarines will be laid down at Chalons-sur-Saone, alongside some of the newest French underwater craft.

It will be difficult to imagine a more unlikely place to find a naval shipyard than at Chalons, which is literally in the heart of France. The yard was originally founded for the construction of torpedo boats in the days when the first-class boats were quite capable of being swung on board a battleship by means of a derrick, and although the size of torpedo craft has increased so rapidly the firm's reputation has kept them tolerably busy.

Some of the submarines are far too big for the river, with the result Schneiders have specially designed a large submarine-carrying barge which can navigate the Saone and the Rhone in spite of shallow water, especially in the latter river. This barge is named *Porteur*, and has dimensions 292 feet by 39 feet, although its loaded draft is just over 4 feet. This yard is surely as extraordinary an establishment for the construction of such an up-to-date vessel as the submarine as can be found anywhere in the world.

Cherbourg to be made important military air port

[From a consular report]

Cherbourg, now the most important French naval base on the English channel and the location of a naval arsenal established in 1803 during the ascendancy of the first Napoleon, is soon to be made one of the leading air ports of northern France.

The Minister of Marine (Secretary of the Navy) has approved the setting aside of a large terrain near Querqueville, on the outskirts of Cherbourg, which was expropriated by the state at the outbreak of the late war, for the construction of hangars for dirigibles and other works of an up-to-date aviation field.

This work has heretofore been postponed because of representations alleged to have been made by Great Britain. One hangar for a large dirigible now exists at Montebourg, about 12 miles from Cherbourg.

For the past year 60 workmen have been employed at the Ateliers de Béton on the work of preparing reinforced concrete foundations for the hydroplane port of the naval arsenal near the Place Napoléon in Cherbourg. Massive works of masonry already in place are of conical shape, 35 feet in circumference and from 22 to 25 feet in height. Twelve of such pillars support a platform which extends from l'Onglet 650 feet into the roads.

On this platform will be constructed lines of rails to accommodate carriers for launching the hydroplanes.

Local opposition to this undertaking has developed, as many citizens favor the use of this part of the shore for a bathing beach and believe that all airplane activities should be centered at the new airport at Querqueville.

The Palyvestre air station

A visit to the Palyvestre air station, about 2 miles east of Hyères (near Toulon), was recently made.

This station is a new one, and the commencement of work to develop it into an air station started in April, 1925. Rumors were heard that this station was to eventually house the dirigibles from Pierrefeu air station, but the commanding officer stated that this was not so and that it was to be only an air station for heavier-than-air craft, but it will of course be of service to that station. However, in the far end of the station two large hangars were about 25 per cent completed, and although they were approximately 240 feet long and 90 feet wide they were entirely too high for simply housing heavier-than-air craft. The hangars in height are about 90 feet, and the supposition is that they may be used for small dirigibles or that later they may be increased in length. We were not shown through the uncompleted hangars, but they were pointed out from a distance of 1,000 yards.

The field is a nice landing field, and the weather conditions are excellent for operating heavier-than-air machines. It is 2,100 feet long by 1,500 feet wide.

At present there are 12 officers and 200 men who operate two squadrons of planes, one a fighting squadron composed of 14 Dewoitine pursuit land planes and an observation squadron composed of 7 (Leo, 7) and 5 Bréguet 14–B2, a total of 26 planes. It did not

appear to be an active organization as yet, but its possibilities are very great, and it does appear that it may eventually develop into an active operating station.

It was noted that the officers and men were neat in dress and especially military.

The housing facilities for officers, offices, and men were very poor, the offices and officer quarters being very old houses converted into quarters and offices. The quarters for the men were old wooden barracks and very much the same as the old war barracks now used by the army at some of their stations.

The hangars in present use were two canvas hangars with steel framing 100 feet by 50 feet, one used for trucks and motors and the other for storage of spare parts. There were also 8 large cases of airplanes for spares.

A radio house was installed on the end of the field and was merely an old house converted to use as a radio building. The radio masts were of steel and appeared quite good, as did the radio apparatus.

One of the most interesting items noted on the visit were two German hangars 100 feet by 60 feet made of steel and concrete and with cement decks. These two hangars were in excellent condition, very clean, substantial, and the equal of any United States Navy hangars for housing planes.

The condition and appearance of the planes and the two German hangars were excellent.

The officer conducting the visitors stated that all repair work to engines and planes was accomplished on the station, but it was understood that this meant only running repairs for engines. There was no machine shop on the station at this time.

The commanding officer stated that the construction of the officers' and men's quarters would be started in the near future.

Activities of Bréguet aviation plant

From M. Bréguet, head of the above plant, the following information, thought to be reliable, was obtained:

His factory is at present manufacturing 59 planes per month. His output for the year will be 800 planes. These are manufactured for Argentine and several European countries, including Greece.

The Turks have recently placed an order for 30 planes with M. Bréguet.

Rules of precedence concerning the military and naval attachés of the French missions in foreign countries

[Source reliable]

The relation of precedence of the military and naval attachés with the civil personnel of the mission are regulated as follows:

At ceremonies and receptions attended to by the whole mission the military and naval attachés form a distinct group and walk behind the civil personnel of the mission.

At ceremonies and receptions where the personnel of the mission is placed in individual order:

1. The military and naval attachés having the rank of general officers come immediately after the diplomatic representative; however, in the case where the eventual acting director of the post bears the title of minister plenipotentiary and has been a greater number of years in his class than they have been in their rank he takes precedence:

2. The military and naval attachés having the rank of superior or subordinate officers occupy the second place after the head of the mission, the first place being reserved to the eventual director of the post; however, they compete for the first place in the event of the eventual acting director of the post having been assigned to this function only through the absence of the secretary occupying the highest rank on the list of the mission; the precedence is then determined as follows:

3. The assistant military attachés and the assistant naval attachés are placed in the following order: The colonels and the capitaines de vaisseau (captains) on the same rank as the councilors of the embassies; the lieutenant colonels and capitaines de fregate (commanders) on the same rank as the first secretaries of embassies; the chefs d'escadrons ou de bataillons (majors) and the capitaines de corvette (lieutenant commanders) on the same rank as the second secretaries of embassies; the capitaines of the army and lieutenants de vaisseau (lieutenants) on the same rank as the third secretaries of embassies; the lieutenants of the army and enseignes de vaisseau (ensigns) on the same rank as the attachés to the embassies. In each rank the precedence is determined by seniority.

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FRANCE

THE RUSSO-ASIATIC MENACE THROUGH ISLAM ROUTES

[By Jean Leune]

Abd-el-Krim in revolt against the Sultan of Morocco, his sovereign, could not have forced the protecting powers, France and Spain, to the military effort they have been compelled to make this year if he had not been encouraged and supported from without. Attention has often been called to the ties connecting him with Moscow—by way of Berlin.

In China, at the other end of the Old World, local manifestations of discontent have rapidly degenerated into serious disturbances under the direction, as it is no longer possible to deny, of Soviet Russian elements and organizations.

In Syria the Druzes, who were expecting English support, have risen on advice from Moscow, via Berlin, followed by an effective reinforcement in consequence of which the revolt has spread to a dangerous extent; thus it is that shells found among the ruins of the Palace of Azem were of German make.

Meanwhile the Turks, at the time when the League of Nations had to acknowledge their difference with London, massed several thousand men in the vicinity of Mosul. We then saw—a truly novel revelation—the British Empire a prey to serious apprehension because back of the Turkish troops it thought it saw in reality the glistening red bayonets of the Third Internationale ready to descend upon the imperial route to India.

Thus back of all these openly declared or threatening disturbances that are agitating the most widely scattered portions of the Old World we find the activities of the Moscow Internationale. The directors of Red Russia have adopted this attitude because today they have not only Russia but all Asia behind them.

In an article published in our issue of June 27, Doctor Legendre expressed the idea that a revolt by the Asiatics against Europe must be regarded as an imaginary danger so long as these same Asiatics did not find "a great nation of the white race who would weld and organize their masses and hurl them against the West." Now, this great white nation does exist; it is Soviet Russia.

Why and how has a Russo-Asiatic association achieved its formation? Simply through a common hatred of the West.

To Asia the West has for two centuries been a powerful adversary against whom it was difficult to struggle. England, to the south along the great maritime routes and Russia to the north—she then called herself European in order to meet the needs of her ambitions—along the great continental routes, were establishing themselves on Asiatic territory and more or less successfully implanting

western civilization of which they were the self-declared champions, affirming that it was superior to that of the East and Far East. For a long time the men of Asia believed in this superiority to such an extent, indeed, that some among them, the Japanese, at last made strenuous efforts to adapt themselves to this superior civilization.

Then came Tsushima and Moukden, and western prestige received its first blow. The great war followed, in the course of which the Allies and Germany, in their hostile propaganda, accused each other of the worst atrocities, the most abominable barbarisms. And the Asiatics, perhaps because of the German propaganda, was more clamorous or more efficiently conducted than ours, perhaps also because in their inner conscience they were glad of an opportunity to despise the Europeans en masse, did not in the least endeavor, or at any rate but feebly and without conviction, to make a just discrimination between the accusations on both sides. Hindus and Chinese have said to me at different times: "In your war you all employed asphyxiating gas, flame, and frightful bombs. You killed women, children, and old men with explosives. We do not care who began it; that does not concern us. We merely know that you Europeans, one and all, fought like barbarians, and we conclude that a civilization capable of producing such abominations has no right to dominate the other civilizations." All Asia, therefore, learned to despise the West.

Gandhi, in India, has preached the return to the simplicity of former times in a veritable crusade against modern progress, industrial and otherwise, which, in his opinion, "has poisoned the world." He has urged upon the Hindus a policy of "noncooperation" with the English, while Rabindranath Tagore has stood for the most violent forms of reaction.

England, in order to satisfy her Dominions in the Pacific, turned aside from Japan in spite of the avowed perfect correctness observed by her ally under all circumstances during the course of the war. Finally, in 1924, the United States took vexatious measures against the Japanese with a view to practically excluding them from United States territory, which provoked general indignation throughout the Japanese Empire.

Thus it was that, little by little, after the termination of the European war, all Asia, as it were, turned against the "whites" of Europe, with whom she associated also those of America.

Meanwhile the Turks, who proudly declared themselves to be not Europeans but Turanians, and consequently pure Asiatics, were fighting with the Greeks, the champions of the ambitions and hatreds of England. The victories of Mustapha Kemal were added to that of Moukden. On the one hand, the West by its resistance to soviet imperialism rapidly took on in the eyes of the Muscovite leaders

the character of an embarrassing adversary whose destruction must be achieved at any cost. On the other hand, Asia was manifesting an increasing hatred toward the western powers. Asia, moreover, is people by 800,000,000 inhabitants.

Red Russia therefore declared herself an Asiatic power in order that she might organize, arm, and one day use this great mass against the West.

THE BOLSHEVIK PLAN

The Bolshevik leaders know how to go to work to overthrow an enemy. They have behind them the experience of 1917, when they brought about the downfall of czarist Russia, sorely pressed by the Germans, by simultaneously disrupting all its powers of resistance by the internal revolution.

The West has thought to protect itself against the Red wave by erecting before it in eastern Europe a barrier of entente States extending from the Black Sea to Scandinavia. But behind this barrier the Third Internationale will organize the internal dislocation of the western bloc by means of Germany and the communistic parties it will have created in England, France, and wherever it has been possible to do so.

Moreover, the "Executive bureau of the Communist Internationale," the Komintern, will prepare Asia politically for the anti-occidental rôle it intends her to play.

Economically the Nijni Novgorod fair will be an extremely important bond between Russia and northern and central Asia, a bond fortified by the creation of the branch fairs of Kharbin for Mongolia and China, and of Baku and Teheran for Persia and Turkey.

Militarily, Russian officers will participate in the training of the Chinese Army and in the organization of the Mongolian troops. Powerful German-Russian works installed in coal and mining centers on Russian or Siberian territory will prepare the necessary armament out of sight of inquisitive observers.

Some day, therefore, it will be an easy matter to bring a portion of the troops thus trained over the Siberian and Russian plains to the frontiers of the West, to this East-European barrier formed by Rumania, Czechoslovakia, Poland, and the Baltic States.

I said "a part of these troops." As a matter of fact, the Red leaders are wise tacticians and do not expect to conquer the West merely by heavy blows, no matter how shattering, to which reply will be made by equally terrible blows from within. To be more certain of victory, and to obtain it with a minimum of effort, they are planning to turn the enemy so as to be able, always by way of land, which alone makes mass movements possible, to attack him in the rear at the same

time they are attacking him on the front, and thus render his downfall easier and more certain.

Starting from central Asia, whence flowed the great invasions that formerly destroyed the Roman Empire, a great land route leads toward Europe south of the Caspian Sea. The Mongolians advanced over this route as far as the Mediterranean. The Arabs, after Mohammed, penetrated by it to the very heart of France—to Poitiers.

This route starts in Turkestan, passes between the Caspian Sea and the Afganistan wall, crosses Persia and Mesopotamia, and by way of Syria arrives at the Isthmus of Suez. Thence, via Egypt and north Africa, it leads to the banks of the Straits of Gibraltar, opposite Spain. All the way from Turkestan to Morocco it traverses countries that are exclusively Mussulman (with the exception of Syria and Egypt, where there are Christians, but in a minority). This route represents almost the whole of Islam except Arabia, northern India, southern China, and the Malay Peninsula.

ISLAM AND RED RUSSIA

Geographically this great thoroughfare possesses a certain unity. Militarily it has been used with success by resolute invaders. Moreover, the religious unity and morale of the peoples who guard it make it possible to influence them much more easily than if they were separated from each other by race hatreds or conflicting interests. It was therefore natural that Moscow felt no hesitation in utilizing Islam against the West and in borrowing the great Mussulman route for the proposed turning movement. With this intention, the Bolshevik project comprises the creation, from central Asia to Gibraltar, of a continuous series of independent Mussulman States, capable of being quickly transformed into republics, which could then enter the Union of the Socialist Soviet Republics or at least affiliate with the union.

When that day arrives the Third Internationale and its Asiatic troops will menace the West simultaneously on its eastern frontier and on its southwest confines opposite Spain. With Germany raising her voice in the very heart of the West, and with communistic disturbances taking place simultaneously in England, France, Italy, and Spain, it is easy to see that the Red troops would not have to make a very great effort to place all western civilization in mortal danger.

The Mussulman doctrine, however, is opposed to Bolshevik theories. The Koran has firmly established the social institutions, such as private ownership, which the new Red gospel claims to

destroy. Mussulman society rests on foundations that are essentially religious and could not therefore accommodate itself to the atheistic principles of Lenine.

What of that? The heads of the Third Internationale desire above all else to strike down an adversary who is interfering with their imperialism. They need Islam to carry out their general plan of activity and have therefore simply adapted their manner of working to the special conditions of Mussulman territory.

In order that this work may bear fruit, they have begun by securing for themselves, on the borders of the Islamic routes which they intend to utilize, a strategic point of support of capital importance, the Caucasus. Contrary to the expressed will of the different Caucasian populations of Gaghestan, Georgia, and Azerbaidjan, they have been in military occupation of the entire country since 1920–21, and definitely consolidated their seizure of it in September, 1924. In this way the Red troops dominate and command simultaneously the plateaus of Iran and Anatolia, from where it is possible to menace the Persian routes to Syria and the Mediterranean and also the Suez Canal.

Unfortunately, Europe has failed to comprehend soviet activities in the Caucasus. She has turned a deaf ear to the appeals of the Caucasians, not realizing that the occupation of their country by the Reds was the keystone of the arch of the entire antioccidental policy of Russia. From the Caucasus, Moscow is a constant menace to Angora, and it was due to this fact that the soviets were able to compel Mustapha Kemal, contrary perhaps to his own feeling, to come to an agreement with them.

This first base acquired, the Third Internationale was in a position to undertake its work in Islam territory. The Komintern, having made a close study of the elements it wished to utilize, very soon realized that its agents would have a chance of being listened to by the Mussulmans in Asia and Africa only on condition of appealing to their religious and national sentiments, or rather their nationalistic sentiments. By awakening the dormant fanaticism of certain slightly cultivated groups, among some of whom it has long been dulled, and by arousing the aspiration to independence of populations that are essentially proud and to whom the least subjection would seem insupportable in principle, the men of Moscow—atheists and internationalists at home—succeeded in provoking serious antioccidental reactions along the thoroughfares of Islam, which, if they did not all lead to the rapid creation of independent states favorable to those who would have aided in their liberation, nevertheless would at least hamper if not weaken the West.

For this work of propaganda and instigation, the Komintern has available a very compact and judicious organization. On Russian or friendly territory, at Vienna, Odessa, Tiflus, Tachkent, Peking, and Canton, this organization has created sections of the Komintern, each with a well-determined field of action.

The so-called "Diki" section at Vienna operates through the West and especially in the Balkans. The Odessa section has all the Near East, Egypt, and north Africa for its field of activity. Tiflis "works" Turkey and Persia. Tachkent operates in Afghanistan, British India, and Indo-China; Peking, and Canton in Mongolia, China, and Indo-China.

Operations in Islamic countries start from these great centers and are carried on first by direct agents, then by the intermediation of local nationalistic organizations created by the Komintern or with its financial support. One of the most important is "The Future of Islam," with headquarters at Koniah and in control of large funds. A "technical section" of this association operates at Smyrna, where it sees to the safe entrance into Turkey of arms and ammunition, to be then distributed in large secret stocks, or if necessary forwarded to revolutionaries who may be in need of them, such as the Riffians, Druzes, etc. To "The Future of Islam" are attached all the nationalistic and revolutionary committees of the Near East. Consequently, anything that takes place will always appear to the eyes of the Mussulman populations and to those of the western powers as a Mussulman action, and thus it is that Islam falsely appears in the eyes of westerners as a danger that must absolutely be kept down. Those who are directing these activities remain carefully concealed, an essential condition to their success, which in turn enables them to arouse the sympathies of all believers in favor of the Mussulmans in an open struggle against the West.

The Komintern has recently tried to influence Egypt, because there the vital junction of the Islam routes is reached. Egypt is the Isthmus of Suez, the one terrestrial passageway from Asia into Africa; Egypt is the canal, the one maritime passageway between Europe, India, and the Far East, the loss of which would be of tremendous importance to the West. Egypt, moreover, is the rich and fertile valley of the Nile with its agricultural resources; finally, through the University of El Azhar at Cairo, Egypt, is the very brain itself of Islam. This is why well-trained agents from Odessa and Tashkent were sent to Cairo for the purpose of inciting, if possible, among the shieks and students of El Azhar—fervent Mussulmans who had come from all parts of Africa and Asia to

learn and study the true doctrine of the Koran—a movement at once religious and nationalistic, strictly seditious and revolutionary in character, which should extend first throughout Egypt and then spread to the neighboring countries, especially Syria and north Africa. Happily, this undertaking has been uncovered by the Egyptian Government and put an end to for the time being by arresting en bloc all the agents of the Red propaganda.

Finally the revolt of Abd-el-Krim was to lead to the creation of an "independent republic of the Riff," which would have constituted at the western terminal of the Islam routes the counterpart of the Turkish Republic at their center.

THE UNITY OF ISLAM MOMENTARILY BROKEN BY THE ABOLITION OF THE CALIPHATE

All this religious and nationalistic agitation is naturally but the final stage of the work of the Third Internationale. The example of Turkey is there to enlighten us. The soviets knew how to profit by the critical situation in which Mustapha Kemal found himself at the time of the offensive operations by King Constantine. But with Turkey victorious, thanks to the valor of her army, the neutrality of Russia, and the support of certain Mussulman elements, the soviets had reason to fear that Turkish Islam might at a given moment take umbrage at the purely interested friendship of a government based on principles entirely contrary to those of the Koran. On the other hand, an energetic caliph might perhaps some day unite the Islam forces in a vast pan-Islam movement which would be dangerous to communism, especially if some western power was clever enough to support this movement in order to oppose the soviets. To prevent this unification it was necessary to destroy the caliphate, which was getting entirely beyond soviet influence. England's attitude compelled the new Turkey to once more seek the friendship of Red Russia. To preserve this friendship, the Angora Government was forced to make a choice—and the caliph was therefore expelled. No mistake was made at Moscow in considering the abolition of the Turkish caliphate as a veritable decapitation of Islam and in foreseeing that the Mussulmans would not for a long time be able to agree among themselves on the choice of a new leader. With the Sultan gone, Turkey became a republic. In the eyes of the Mussulman world it was Mustapha Kemal alone who had driven out the caliph. He was blamed by some. In Turkey itself a religious opposition began to take form. The dictator was compelled to combat and destroy it by thoroughly laicizing the country, which at the same time did away with every religious obstacle to Russian influence and today permits the Komintern to hope for a closer and closer rapproche-

ment between Angora and the Union of the Soviet Socialist Republics.

Was England so greatly deceived in thinking that she saw Red bayonets glistening behind the Turkish troops at Mosul?

This is not saying the Mustapha Kemal wishes to sovietize his country, but it all clearly indicates in what direction the support of the Third Internationale, whether direct, indirect, or camouflaged, carries those who have accepted it—it is always against the West.

The Riff, the menace of Mosul, the bloody events in Syria and China, following the conquest of the Caucasus, are still not the Red attack nor the rise of Asia against the old Europe. These are as yet merely tentative efforts at realization, attempts at active mobilization, if one may so term them. In anticipation of the events of tomorrow, and in order to be prepared for them methodically and with certainty, the Third Internationale is making soundings, testing the ground, taking a census of the forces on which it may depend, carefully observing the reactions produced by it among us and noting our weak points.

THE DUTY OF THE WEST

And it is precisely this that should dictate to us our duty. Islam also is observing our reactions. Mussulmans have been found—not true believers, indeed—who were willing to listen to the interested encouragements from Moscow to fanaticism and nationalism after the victory of Mustapha Kemal over the Greeks because the latter appeared to all as soldiers of England. If France and Spain do not triumph over Abd-el-Krim, and if France does not succeed in restoring quiet in Syria, many other Mussulmans will be led to believe in Moscow.

The West should therefore first of all understand the extent of the Russo-Asiatic peril menacing it. To ridicule or deny it would repeat in a still more serious manner the terrible mistake of the Caucasus, the consequences of which will weigh heavily upon us for a long time to come. There is no question of an immediate invasion by Asiatic hords, renewing the days of Attila. But there is a question of admirably organized, systematic work which, by a succession of bloody incidents—men are falling in Morocco, China, and Syria and may also fall before Mosul—will end by placing the West at the mercy of Russo-Asiatic demands, coupled with the demands or extortions of a reconstituted Germany in condition to play the terrible rôle of arbiter—and what an arbiter!—among the adversaries.

The western powers must agree to unite in the presence of this danger. It is a mistake that may prove fatal to believe to-day in the possibility of gaining something for one's self from the difficulties one's neighbor has to face, at a time, too, when his enemies have been

more or less skillfully aroused against him. For it is certain that if we are led to abandon Syria our departure will immediately incite the entire Arab world bordering on Suez to respond to the appeal of Moscow by a general revolt against the English.

Fortunately, we have in our favor the important fact that at heart Islam is thoroughly opposed to the Bolshevik doctrines of equality by leveling downward. We also have in our favor the further fact that the brain of Islam, the University of El Azhar, where the true orthodox doctrine of the Koran is taught and from where it is disseminated throughout the entire Mussulman world, is located in Egypt, at Cairo, precisely at the vital junction of the Islamic routes.

It depends upon England alone whether or not, by her policy in the valley of the Nile, she shall set this brain of Islam against herself and the West, whether or not she shall prepare against herself and us the rupture of the junction of Suez by the submission of the Arab and Egyptian peoples to the dictation of "The Future of Islam" or some other extreme organization likewise maneuvered from Moscow. In the course of the last century the Khedive Ismail proudly declared: "My country is no longer in Africa; it is in Europe." This phrase, which has become, as it were, the outward expression of dynastic Egyptian tradition, to-day takes on a singular significance.

Will Egypt in fact remain Mediterranean, European, in the sense of this tradition, and especially as King Fouad, her present sovereign, wishes, or will she turn toward Asia carried along by certain antidynastic elements who seem to forget the glorious past of their country whose Pharaohs, in their day, achieved their greatest glory by fighting always and with all their might against Asiatic invasions?

An Asiatic Egypt would signify the brain of Islam, and then all Islam definitely turning away from the West. Now, if the Third Internationale has abolished the Turkish Caliph because it feared him, granting that it could not influence him, it is ready to propose a new Caliph to the Arabs, chosen by itself, who would then achieve the unity of Islam in the Russo-Asiatic sense. Does the Government of London doubt that the first act of such a Caliph would be to "work upon" British India where 72,000,000 of Mussulmans of essentially warlike race have for a long time been dissatisfied with their present masters?

All this proves the value and the efficacy of the old French foreign tradition of the union, the peaceful grouping, of countries and peoples having common sentiments and interests, as compared with the tradition of "divide ut impera," which contains within itself

a germ of weakness and destruction corresponding to the will to dominate, to the imperialism expressed by the motto itself. Do we not see the results that the Third Internationale is obtaining in Asia by applying our own methods in order to crystallize around itself all the peoples whose number and force it dreams of utilizing to destroy the West?

Francis I was right centuries ago when he maintained that western Christendom should depend upon Islam to defend itself against the evil forces threatening France. To-day Islam is no longer the key to the arch of the Western World alone, but indeed, that of the entire Old World.

TO WARD OFF THE MENACE

The constitution of a French-English-Arab bloc, resting on an Egypt friendly to the West, to which it would also be attached by a thousand ties of civilization, would mean Suez protected and guarded against Asia, Islam hostile to Bolshevik theories and to Russo-Asiatic appeals, and the West preserved.

But let us not forget that the directors of the Third Internationale are skillful, methodical, and supple. They know how to attack our will to resist and our defensive organization with fair words. Let us therefore be extremely vigilant.

Thus, after having engaged in frankly anti-French and antiwestern maneuvers at Berlin during the Locarno conference, Mr. Tichtchérin came to Paris. By a curious coincidence, doubtless, Rouchdy Bey, the Turkish minister of Foreign Affairs delegated to Geneva to follow the Mosul dispute, arrived at Paris almost simultaneously, two days before the Angora Government was to take in this affair a decision pregnant with consequences for the future. Let not Mr. Tichtchérin's interested declaration divert our attention in the least, as the author would like them to do; let us not forget that the soviet ambassador to Pekin, Mr. Karakhan, who left Moscow on the same date as the Commissioner for Foreign Affairs, is simultaneously organizing a veritable antioccidental revolt in China while supporting in every way the Chinese-Bolshevik elements which the Third Internationale would like to see in full control of the entire country at as early a date as possible Did not the chief of political instruction of the Red Army recently proclaim that the world will soon have to reckon with an Orient and Asia directed by the soviets?

It has been said that history is an eternal recommencement. We are therefore justified in saying that the Russo-Asiatic menace is not a myth and also in declaring that if we will, and if we know how to act in time, the West may still avert this menace and ward off this danger.

But we must will and not wait. It is easier to prevent the materialization of an evil that one sees approaching than to arrest its development and cure it. It is much easier and, in any case, infinitely wiser.

GERMANY

MISCELLANEOUS NOTES

New school plane

The Focke-Wulf Airplane Co. in Bremen, whose traffic plane is already well known, has now begun to build school and sport planes. The new type, known as S–I, is based on the experiences gained with the older type Focke-Wulf Z–VII. The trial flight of the first school plane recently took place at Adlershof, and an altitude of 2,300 meters was attained with full load. However, this in no way represents the maximum altitude. The climb had to be broken off owing to the approach of darkness.

According to the measurements of the German Aeronautical Testing Institute at Adlershof (DVL), the plane had a speed of 118 km/hr. with a 55-horsepower Siemens motor, and over 130 km/hr. with a 75-horsepower Junkers motor. It has a ground speed of only 50 km/hr., and therefore seems especially adapted for training work and the first independent flights. One point that should be especially mentioned is the plane's extraordinarily firm, quiet position in the air, even when making the sharpest wing curves. However, its construction is not so hardy and coarse that the pupil's experience in handling it proves a drawback when changing to more sensitive types of planes—a condition that is often experienced with heavy school planes.

The wing construction is similar to the successful type Focke-Wulf A–16, and is so arranged above the fuselage that both instructor and student have unobstructed vision. Both sit alongside of one another and are protected by a high, strong box beam in the event of turning turtle.

By constructing the wing with only one box beam, it has been possible to place the instructor and pupil so far front that they have a clear view over the front edge of the wing surface, which is further augmented by openings in the wing next the seats for the purpose of vertical observation.

By placing the seats in the immediate proximity of the center of gravity the burden is not altered by carrying one or two persons.

The motor installation is fireproof and easily accessible. There is a gravity tank for the fuel which is located in the wing and carries sufficient fuel for three hours.

The landing gear has been made unusually strong in view of the hard landings to which school planes are subjected. However, the interchangeable axis is used as a safety measure which bends in the event of too hard a jolt, and thus protects the plane. The double steering is built in such a way that the teacher can couple the most important steering gear (elevator) with that of the student in order to avoid any danger during the first flights.

The first plane of this kind was recently delivered to the Halberstadt Aircraft Co., where it will be used for training and round flights.

The specifications of the new plane are as follows:

Span	meters	12.00
Length	do	8.10
Maximum height	do	2.30
Carrying surface	square meter	22.00

Motor, 55-horsepower Siemens & Halske (75-horsepower Junkers).
Propeller, Astra or Heine, 2.30 meters in diameter.
Weight empty, 470 kg. (510 kg).
Load, 200 kg. (230 kg.) consisting of 1 pilot, 75 kg. (80 kg.); 1 passenger. 75 kg. (80 kg.); fuel for 2½ hours (3 hr.); 50 kg. (70 kg.).

Total weight	670 kg. (740 kg.).
Wing load	30 kg/h. p. (32).
Speed	120 km/h. p. (135).
Performance load	12 kg/h. p. (9).
Ground speed	50 km/h. p. (55).
Climb	1,000 meters in 12 min. (10).
Flight period	About 2½ hr. (3 hr.).
Cruising radius	About 350 km. (400 km.).

The last eight items are with full load and full motor performance.

The Junkers all-metal school plane, Type T–26

Fuselage, square, running off into a vertical blade.

Pupil sits in front of instructor.

Wings unspanned; upper wing fastened on struts, lower fastened close to fuselage, braced against the upper by means of V struts.

Depth and thickness gradually decreasing.

Landing gear, Junkers high-hub strut.

Span	meters	13.15
Length	do	7.54
Height	do	2.72
Wing surface	square meters	33.5
Motor, Junkers L–1–a	h. p.	60
Weight empty	ton	0.58
Load	do	0.23
Total weight	do	0.81
Wing load	kg/sq. m.	24.0

Performance load	kg/h. p	13.4
Wing performance	h. p/sq. m	1.8
Speed	km/hr	60-115
Ceiling	km	2.5
Fuel supply	liters	60

The new Navy Register

The German Navy Register for November 1, 1925, has just been issued. The arrangement is the same as that of last year. The chief of the Navy Department is Admiral Zenker, as before. There is now a fleet command in place of the commander in chief of the naval forces. The chief of the fleet is Vice Admiral Mommsen, former commander in chief of the naval forces. The commanders in chief of the Baltic and North sea forces are under the jurisdiction of the chief of the fleet. The first is commander of the scouting forces, and the latter has the rank of a second admiral of the line ship division. The fleet consists of the four line ships, *Elsass*, *Hessen*, *Braunschweig*, and *Hannover;* the cruisers *Nymphe* and *Amazone;* two torpedo-boat flotillas, a mine sweeper half flotilla, and the survey ship *Panther*. The line ship *Braunschweig* will be replaced in February, 1926, by the line ship *Schleswig-Holstein*.

Under officers under direct jurisdiction of the chief of the Navy Department are the commanders of the naval stations in Kiel and Wilhelmshaven (Vice Admirals Raeder and Bauer). The cruisers *Berlin* and *Hamburg* are under the jurisdiction of the commander of the Baltic station, and the new cruiser *Emden* and the survey ship *Meteor* are under the jurisdiction of the commander of the North Sea station.

The naval budget for 1925 has made some changes in the officer corps, for instance, the ranks from first lieutenant down have been increased while the number of lieutenants has been decreased. At present the personnel consists of the following:

Line officers.—One admiral, 3 vice admirals, 6 rear admirals, 31 captains, 21 commanders, 79 lieutenant commanders, 153 lieutenants, 222 first lieutenants, and 41 ensigns.

Engineer officers.—One rear admiral, 2 captains, 4 commanders, 17 lieutenant commanders, 44 lieutenants, 52 lieutenants (junior grade), and 15 ensigns.

Medical officers.—One general staff physician, 2 general physicians, 3 physicians in charge, 18 upper staff physicians, 39 staff physicians, 21 assistant physicians, and 2 assistants to the former.

Paymasters.—Two chief paymasters, 22 staff paymasters, 34 first paymasters, and 25 paymasters.

The following resignations have been made since the last Register: Eighteen line officers, 10 engineer officers, 10 medical officers, and one paymaster; deaths, two first lieutenants.

Device for reducing visibility of objects

The invention pertains to a device the object of which is to render any object at any distance as nearly invisible as possible. This novel invention is particularly applicable on the water.

The invention consists in shrouding or surrounding the object to be rendered invisible by double-walled glass bodies or by hollow glass balls.

The inventor has made the astounding observation that the light rays which penetrate to the inner space between the glass walls are diverted in such a manner that the object inside this glass cover becomes invisible to the eye at relatively short distances.

This invention is of particular importance for ships and in particular for the periscopes of submarines. However, the entire superstructure of a vessel may be covered by such hollow glass bodies as to be rendered undiscoverable. On the ocean this device is particularly effective on account of the slight differences in color which prevail and the object so covered becomes invisible even through glasses at much shorter distances.

In order that the light rays may be completely diffused (diverted), it is advisable to render one of the walls, either the inner or the outer wall, or several walls, somewhat opaque; this is done, for example, in a simple manner by treatment with hydrofluoric acid gas (to tarnish).

Finally, the desired effect may be obtained by a special optical arrangement of the double surfaces, i. e., by the use of favorably shaped surfaces which will direct the reflected light rays. In order to accomplish this, the same principle is used as employed to obtain polarized light by repeated reflection.

Thus in order to obtain the effect desired, it is only necessary to utilize several glass or reflecting plates, which may be arranged in steps, with or without space between them.

Where a number of surfaces slide over each other, as, for example, in the case of a circular periscope, the glass screen is easily secured in the upper and lower parts of the double-walled glass; rings are slotted and the securing ring fitted into the slots. In the case of the submarine periscope the circular shape is of importance on account of its favorable effect on the reflection. This screen is only to be placed around the upper part of the periscope, while a protective

tube of metal can be made to surround the lower part of the periscope extending up only to the surface of the water.

PATENT CLAIMS

1. A device for reducing the visibility of objects, in particular ships at sea, characterized by the fact that they are screened by hollow, double-walled glass rings fitted around the object.

2. A device according to claim 1, which is characterized by the employment of several glass bodies placed over each other with or without space between them.

3. An arrangement in accordance with claims 1 and 2, whereby one or more of the walls of the surrounding glass bodies are made opaque.

GERMANY

COMBAT ESTIMATE

January, 1926

[Source—M. I. D.]

I. Military

1. STRENGTH

	Authorized strength	Trained reserves	Military man power
Regular army	100,000		100,000
Unorganized war veterans		1,200,000	1,200,000
Untrained			7,200,000
Total			8,500,000

The army is limited by the Versailles treaty to 4,000 officers and military officials with officers' rank and 96,000 men. In addition, there are 500 medical and veterinary officers. Service is voluntary and for a period of 12 years. No reserve organization is permitted by the Versailles treaty.

2. ORGANIZATION

In accordance with the provisions of the Versailles treaty, the army is organized into a war department headquarters (comprised mainly of civilian officials with administrative functions), 2 group commands, 7 infantry divisions, and 3 cavalry divisions.

The infantry division is composed of a division staff, 3 infantry regiments, 1 artillery regiment, 1 cavalry squadron, 1 pioneer battalion, and a detachment each of the signal, motor train, and sanitary services. Strength, 11,240.

Each infantry regiment consists of a regimental staff, 3 battalions, 1 trench mortar company, 1 training battalion. One battalion in one of the three regiments of a division is organized as a jaeger (mountain) battalion. Strength, 2,370.

Each battalion consists of 3 infantry companies and 1 machine-gun company.

The company is formed of 3 five-squad sections, 1 small first-line transport (combat train), and 1 large first-line transport (baggage and rations).

Not all the section squads are organized in the same way, there being:

(*a*) Riflemen squads: One N. C. O. and eight men.

(*b*) Machine-gun squads: One N. C. O. and eight men.

(*c*) Signaling squads: Two N. C. O.'s and eight men.

The distribution of these squads throughout the company sections is as follows:

First section: Two riflemen squads, 2 machine-gun squads, 1 signaling squad.

Second section: Three riflemen squads, 2 machine-gun squads.

Third section: Two riflemen squads, 2 machine-gun squads.

Strength of a company: Three officers, 4 sergeants major, 21 N. C. O.'s, 136 privates.

The artillery regiments assigned to divisions are organized into 9 batteries (6 batteries of four guns each and 3 batteries of four howitzers each) and 1 training battery.

Each cavalry division consists of six regiments and a battalion of horse artillery. Strength, 5,525.

No war department general staff, air service, chemical warfare service, or tanks are permitted by the treaty.

An interallied military control commission has been set up by the Versailles treaty. This commission of 165 allied officers has established branches in the main centers of population for the purpose of insuring Germany's observance of the disarmament provisions of the treaty. It is expected that the League of Nations will take over the duty sometime in 1926.

3. EQUIPMENT

a. Infantry.—There are two classes of arms—light and heavy. The light comprises: Mauser type rifle, caliber .311, model '98; Mauser type carbine, caliber .311, model '98 (for machine gunners and trench-mortar personnel); Maxim light machine guns, water-cooled, caliber .311, model 1908–1915; pistol, caliber 9 mm., model 1908; hand grenade, potato-masher type; rifle grenade (9 trom-

blons per company, 150 grenades in the combat train). The heavy arms comprise: Maxim heavy machine gun, water-cooled, caliber .311, model 1908; light trench mortar, caliber 7.6 cm.; medium trench mortar, caliber 17 cm.; infantry cannon—no special gun—they would be taken in case of need from the divisional artillery.

The maximum equipment permitted by the treaty is 84,000 rifles, 18,000 carbines, 792 heavy machine guns, 1,134 light machine guns, 252 trench mortars.

b. Cavalry.—Mauser type carbine, caliber .311, model '98; lance, saber, bayonet. Certain higher grades are armed with the pistol. All cavalrymen are supplied with two hand grenades, a portable tool, and wear steel helmets. Two light machine guns are carried in the cavalry platoons, permission having been recently granted to this effect.

c. Artillery.—Seventy-seven mm. field gun, model 1916 (only 204 of this type are allowed by the Versailles treaty; the normal assignment is 4 guns per battery and 2 battalions of 3 batteries each per regiment, giving a total of 24 of these guns per regiment); 105 mm. howitzer, model 1916, 3 batteries of 4 guns each per regiment (the treaty permits a total of 84 howitzers); 2 light machine guns per battery. There is no heavy artillery.

Each artilleryman is armed with a carbine, sword bayonet, and a hand grenade.

d. The equipment in general is adequate. Reserve equipment and the manufacture of equipment is limited by the treaty to necessary replacements.

4. MOBILIZATION

No organized reserve is permitted. No machinery is supposed to exist for mobilization. Nevertheless, Germany could promptly organize a force much greater than the authorized 100,000. Military societies exist which could be used to create a force of about 500,000 riflemen in a month. The increased force would be lacking in auxiliaries such as artillery, tanks, aircraft, and gas.

5. THEORY OF COMBAT

The Germans follow the general principles of war as stated in our field-service regulations. They advocate and observe the principles of the offensive, primary importance of the infantry, surprise, mass, and maneuver. They seek surprise by secret concentrations, new formations, and new weapons.

With regard to the advance of the infantry in the attack, the principle is adopted that it is not the mission of the rifle to compete for superiority of fire in the protracted fire battle. While the

squads are working their way up to within short range of their rifles (400 yards) the fire battle must be carried on, in the main, by the heavy and light machine guns and artillery. The object is to bring the infantry up to the enemy, as far as possible, undiminished in strength.

6. DISTRIBUTION OF FORCES

Unit	Headquarters	Troop stations
First group	Berlin	Eastern Germany.
First Infantry Division	Konigsberg	East Prussia.
Second Infantry Division	Stettin	Baltic Provinces.
Third Infantry Division	Berlin	Brandenberg and Silesia.
Fourth Infantry Division	Dresden	Central Germany and Saxony
First Cavlary Division	Frankfurt-on-O	North Germany.
Second Cavalry Division	Breslau	South Germany.
Second group	Cassel	West Germany.
Fifth Infantry Division	Stuttgart	Upper Rhine Provinces.
Sixth Infantry Division	Munster	Westphalia and Hanover.
Third Cavalry Division	Cassel	Rhine Provinces.
Directly under war department:		
Seventh Infantry Division	Munich	Bavaria.

7. EFFICIENCY AND MORALE

The army is highly trained and very efficient. The effort is made to train each man so that he may act as an officer or senior noncommissioned officer in case of necessity. Morale is high.

II. Naval

8. STRENGTH

The Versailles treaty reduced the German navy to 15,000 men, inclusive of 1,500 officers and warrant officers, and the number of ships to 6 battleships, 6 cruisers, 12 destroyers, and 12 torpedo boats. Neither air service nor submarines are permitted. The battleships must be of the pre-war type, with displacement of about 13,000 tons. Restrictions as to service in the navy are the same as in the army. The navy is a purely coast-defense force.

9. ORGANIZATION

There are two stations—the Baltic and the North Sea. The following forces are under the jurisdiction of the commander in chief of the naval forces of the Baltic:

SCOUTING FORCE (STATION KIEL)

Line ship *Hannover*	I. Torpedo-boat flotilla.
Line ship *Hessen*	First torpedo-boat half flotilla.
Cruiser *Nymphe*, Flagship	Second torpedo-boat half flotilla.
Hydrographic survey ship *Panther*	1. Mine-sweeping half flotilla.
Tender *M–133*	
Boat *II* for taking surveys	

The following are under the jurisdiction of the commander in chief of the naval forces of the North Sea:

LINE-SHIP DIVISION (STATION WILHELMSHAVEN)

Line ship *Braunschweig* (flagship of the fleet)	II. Torpedo-boat flotilla.
	Third torpedo-boat half flotilla.
Line ship *Elsass*	Fourth torpedo-boat half flotilla.
Cruiser *Hamburg* (flagship, O. C., North Sea)	Tender *M–146*.
Cruiser *Amazone*.	
Tender *Hela*.	

The land forces are composed of 6 coast-defense battalions, 2 signal-corps companies, and 2 training depots, divided equally between the two stations, with a total fixed strength of 4,818. Each battalion consists of a staff, 3 companies, and a machine-gun company; total strength, 620.

10. DISTRIBUTION

The fleet is stationed in home waters. There are no bases outside of Germany. The coast-defense battalions have the following stations: No. 1, Swinemunde; No. 2, Wilhelmshaven; No. 3, Kiel; No. 4, Cuxhaven; No. 5, Pillau; No. 6, Borkum.

11. EFFICIENCY AND MORALE

Discipline, training, and morale are high.

III. Geographic

12. GEOGRAPHIC INFORMATION AFFECTING THE STRATEGY OF THE COUNTRY

On the south, the mountain barriers of the Alps, Erzgebirge, and Riesengebirge are a natural assistance in defense. East Prussia is entirely separated from the rest of the nation by the Polish Corridor. Two dangerous salients point westerly and northwesterly toward the capital, i. e., the Polish salient of Posen and the Czechoslovak salient of Bohemia. The transfer of Alsace-Lorraine leaves a minor salient there. Germany is faced on the east and west by enemy countries. In the east these countries owe their existence to the Versailles treaty and their continuance depends upon the observance of its provisions. Thus, Poland, Czechoslovakia, and France may be expected to work together in keeping Germany within her present boundaries and in a weakened military condition. Germany is centrally located from an air transport standpoint.

IV. Conclusions

Germany is in a weak military, economic, and political position. The foreign occupation of the Rhineland second and third zones (Coblenz and Mainz) and the provision that the Rhine Valley to a line 50 kilometers to the east of the Rhine shall remain demilitarized leave western Germany wide open to attack from that direction.

German sovereignty is further restricted as follows: (1) Occupation of the Saar Valley; (2) internationalization of the Kiel Canal, Elbe, Oder, Niemen and Danube Rivers; (3) reparation obligations under the Dawes plan and London agreement, with the consequent foreign supervision of economic life of the country and drain on its energies; (4) restriction of the size and composition of the army and navy, and of munitioning capacity within small and well defined limits, and (5) foreign supervision of its military situation to insure the disarmament provisions of the Versailles treaty.

Artificial defenses on all fronts are either destroyed or reduced to low efficiency. However, Germany has not mentally disarmed.

Germany has succeeded through the Locarno agreements (by which she guarantees her present boundaries against forcible change on her part) in freeing herself materially from the trammels of the Versailles treaty. While her present military force is small, she has strong potential military power and strong military spirit. Germany will continue her efforts to increase her war-making ability to the point where it is commensurate with the character of her people and the resources of the country. She will point her policy, internal and external, toward a return of the lands lost as a result of the World War. There will probably be no war until a powerful ally is secured and Germany has recovered her strength.

The extent to which the League of Nations, the Locarno agreements, and the present more peaceful spirit in Europe may modify this trend on Germany's part can only be determined by future developments.

GREAT BRITAIN

MISCELLANEOUS NOTES

[From the British press]

Recent Trials

New Submarine "L–27"

The new submarine *L–27*, which has been commissioned at Sheerness dockyard for her official trials, is ordered to carry out her preliminary sea trials on December 21, and if these are satisfactory

they will be followed by a six hours' full-power trial and gun and steering-circle trials.

Light Cruiser "Enterprise"

On completion of a 24 hours' trial (12 hours at three-fifths power and 12 hours at four-fifths), the new cruiser *Enterprise* returned to Plymouth, January 15. The trial proved satisfactory, and, according to program, the vessel proceeded to sea January 16, for an eight hours' full-power trial and other tests.

The new cruiser *Enterprise*, which has been completed at Devonport dockyard, left Devonport on January 16, and carried out an eight-hour full-power trial in the channel. We understand that the trial was satisfactory.

The machinery for the *Enterprise* was constructed by Messrs. John Brown & Co., Clydebank, and her engines have 80,000 horsepower.

The *Enterprise* will undergo other trials January 18, 19, and 20 and on January 21 will go up harbor and enter No. 5 basin. She will pay off on January 22d, and afterwards will be prepared for service on the East Indies station.

Recent Refits

The cruiser *Canterbury* is expected to be out of dockyard hands at Chatham on January 23, after her refit, for which £31,400 was set aside in the last navy estimates.

On completion of her present refit the battleship *Warspite* will commission with a Devonport crew about the end of March for service on the Mediterranean station. The battleship *Valiant* will concurrently pay off into dockyard control for large repairs at Portsmouth.

The *Emperor of India*, battleship, is to be taken in hand for refit at Devonport next April. The vessel was recommissioned at Devonport last May for service in the Third Battle Squadron (Mediterranean Fleet).

Attempt to raise the sunken monitor H. M. S. "Glatton"

After weeks of preparation, the first attempt made on December 10 to raise the monitor *Glatton*, which was sunk in Dover Harbor during the war, proved abortive. With the aid of the moon, the salvors

worked all night to fix the lifting barges to the stout steel hawsers under the warship's keel, and in the hope of benefiting by the morning's tide an effort to raise the submerged hull was made at 6 o'clock, but from some unexplained cause one of the hawsers broke, and further operations for the day had to be suspended.

It will be recalled that the *Glatton* took fire during the war, and in order to save the destruction which would have been caused had the flames reached her magazine and an explosion ensued, she was sunk by gunfire.

Names of Australia's new cruisers

The High Commissioner for Australia (Sir Joseph Cook) announces that the two new 10,000-ton cruisers to be built for the Commonwealth Government by Messrs. John Brown & Co. (Ltd.), Clydebank, will be named, respectively, H. M. A. S. *Australia* and H. M. A. S. *Canberra.*

The *Australia* is the second unit of the Australian fleet to bear that name. The first, a battle cruiser, was sunk in accordance with the provisions of the Washington treaty on April 12, 1924, off Sydney, in the presence of the Special Service Squadron. The *Canberra* takes its name from the new capital city of the Commonwealth.

British naval engineers—Entry and training changes—The status of officers

A short chronological statement of the various changes affecting the entry, training, and status of naval engineer officers should be useful at the present time to all interested in the discussion which has followed the publication of the new fleet order of November 20 on this subject.

Up to the introduction of the Selborne-Fisher scheme of common entry and education of December, 1902, all engineer officers for the navy had been entered separately through the college at Keyham, Devonport. The totals of these officers now remaining on the active list are: Engineer vice admiral, 1; engineer rear admirals, 10; engineer captains, 47; engineer commanders, 249; engineer lieutenant commanders, 21, and aggregate of 327. By the Selborne-Fisher scheme common entry at Osborne, common training in the colleges and afloat, and common status as regards rank, command, and uniform were offered to cadets, whether joining for deck or engine-room duties. On January 12, 1903, a letter from Lord Selborne to a correspondent was published in the Times, in which the then first lord said, as regards interchangeability between the

executive and engineer branches, only time and experience can answer the questions raised by this matter, and "The board in framing the present scheme had to be prepared for either event. Their object is to leave future boards unfettered to act in this matter for the greatest advantage of the service."

The volunteers for engineering in the early groups were fewer than were anticipated. Of the first term at Osborne, 75 joined, 64 passed on to Dartmouth, 56 became midshipmen, and 54 presented themselves for the lieutenant's examination. Only 8 volunteered for engineering. They began (E) training at Keyham on October 1, 1913, and were still under instruction when war began and studies were interrupted. The first of them became lieutenant commanders (E) in the summer of 1920, and 4 were advanced to commander (E) on June 30, 1925. The number of officers of the amended Selborne-Fisher scheme now training on the active list are:

Commanders (E), 4; lieutenant commanders (E), 44; lieutenants (E), 104 (and one acting); sublieutenants (E), 60; acting sublieutenants (E), 15; and midshipmen (E), 40, an aggregate of 267. The method of entry of these officers has hitherto been the same as that of the deck officers, but the period of volunteering to specialize in engineering has been altered at various times in accordance with experience gained. At first specialization did not take place until after a period of service at sea, exactly in the same way as (G), (T), and (N) officers specialize.

During the war the (E) specialists served afloat in a military capacity like other specialists, and in at least one case an (E) officer had independent command. Lieutenant (E)—now commander (E)—A. L. P. Mark-Wardlaw served as engineer officer and second in command of submarine *K–2* in the Grand Fleet, and later was appointed in command of submarine *F–3* at Portsmouth. In March, 1920, in the first public reference to the question after the war, the first lord (Mr. Walter Long) said that it was essential that the majority of officers forming the engineering branch should be whole-time officers. Officers selected for engineering when sublieutenants were to be "definitly placed on the engineering side of the profession, and will not revert during the remainder of their career to deck duties." At the same time midshipmen after one year at sea were encouraged to volunteer for engineering.

A new scheme to give effect to the principle of final separation between deck and engine-room branches was published as a fleet order dated December 15, 1922 (the Times, December 21, 1922). It involved the specialization of officers for engineering immediately on completing their initial training as cadets. Instead of going to sea as midshipmen, candidates for engineering were sent instead

to Keyham College for a four year's technical training before undertaking any duties afloat. The final course for officers specializing under the old scheme began in October, 1924. All volunteering for engineering since that date have done so during their last term as naval cadets.

As Mr. Bridgeman said in the House on December 9, 1925, in a very few isolated cases—not more than five in all—officers who volunteered for engineering prior to 1923 retained certain responsibilities as to military command, while the majority surrendered their option in this respect. The system of entry and training has not been materially altered for (E) officers since December, 1922.

MILITARY STATUS

As regards the status of engineers, the Secretary of the Admiralty announced on December 25, 1914, that from January 1, 1915, "engineer officers of the old system of entry shall be classified as part of the military branch." Thereafter they were placed, in the regulations regarding rank and commands, relatively to officers of corresponding grades in the executive branch. The order in council (January 7, 1915) giving effect to this provided that they were not eligible to command H. M. ships, but otherwise they held rank and command according to the order in which their names stood in the official list. This incorporation in the military branch was expressly continued by the changes dated December 15, 1922, already mentioned. The fleet order then stated: "Officers selected to specialize in (E) under this scheme will separate finally from the executive officers, and though remaining in the military branch will forego all right to subsequent reversion to deck duties and to military command."

When officers of the old engineering branch were absorbed into the military branch on January 1, 1915, it was provided that, while granted the executive "curl" on their uniforms, they were to retain the distinctive purple color between the rows of lace on the sleeve; and, although it was understood that this distinction would die out as the engineer specialists of the new common entry scheme came into service, the new order of November 20, 1925, provides, on the contrary, that all (E) officers are in future to wear a more distinctive shade of purple cloth.

Other methods of entry to the engineering side of the navy have been opened up during the last 12 years. The special entry of cadets of 17½ years of age from the public schools provided a certain number, some of whom are now lieutenants (E). Later on the system of promotion from the lower deck was extended to the branch by means of the grade of mate (E), who, however, on

promotion, take the old rank of engineer-lieutenant. Similarly, the promotions of older warrant officers after many years' meritorious service have been extended, the artificers rising through the grade of commissioned engineer to engineer-lieutenant, and the stokers rising through the grade of commissioned mechanician to engineer-lieutenant. During the war, too, a certain number of R. N. R. engineer officers were transferred as engineer-lieutenants, R. N.

Finally, there is a scheme dating from 1922 of taking promising artificer apprentices for training as midshipmen (E) side by side with the cadets from Dartmouth. The total of these various types of engineers is about 230, or nearly equal to the total of those trained from cadets since common entry was introduced.

Aircraft carrier test of "R–33"

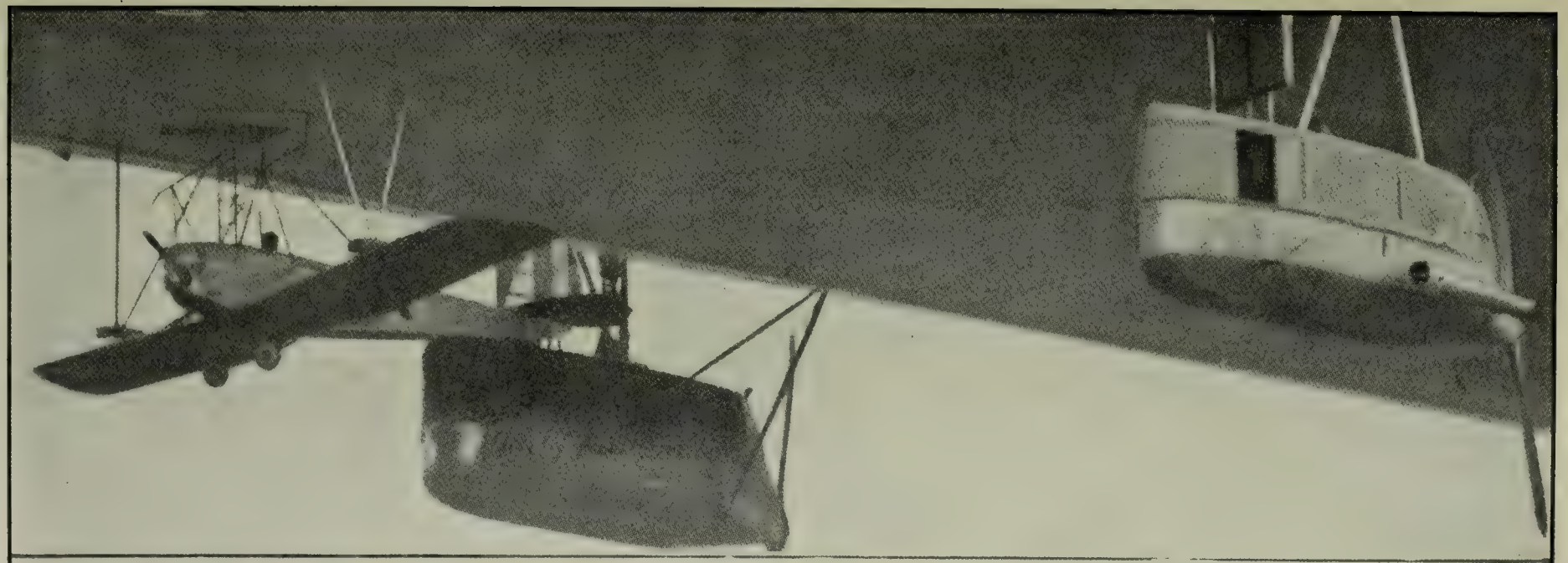
Squadron Leader R. A. de Haga Haig, on December 4, made successful unhooking and hooking experiments with a *D. H.–53* from the Air Ministrys' little secret airship, the *R–33*. Squadron Leader Haig disengaged the airship successfully and then flew along underneath the airship and reengaged the trapeze, which was then wound up to the airship, the crew of which Squadron Leader Haig then rejoined.

Squadron Leader Haig deserves congratulations on his performance, but the person who designed the clumsy-hooking apparatus attached to the airplane does not. The mechanism used in America more than two years ago in the experiments with a Sperry messenger biplane—a larger airplane used from a smaller airship—is much neater and simpler.

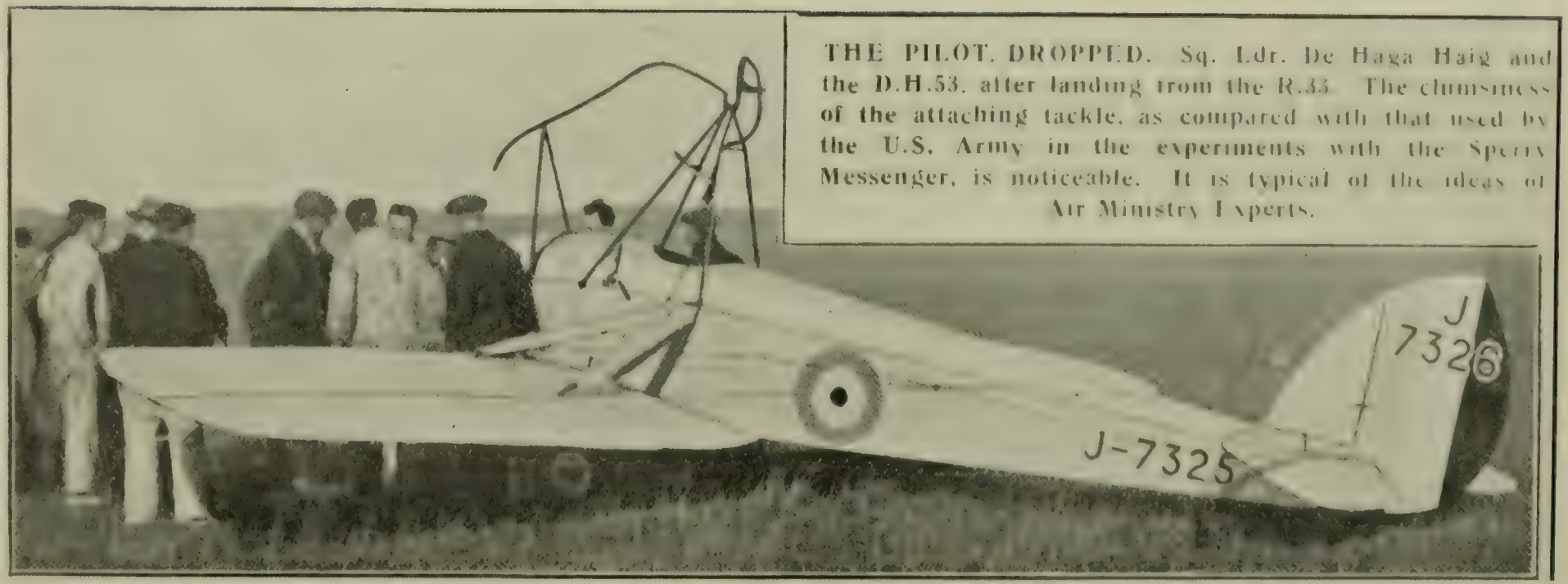
The Air Ministry, in a sudden burst of confidence, evidently induced by that Locarno feeling, or the proximity of Christmas, has permitted the issue of photographs of *R–33*, the *D. H–53*, and Squadron Leader Haig.

London daily paper gives views on United States aviation

London, November 4.—In to-day's edition the Evening News predicts that as a result of the success obtained by North American airplanes in the Schneider cup competition the aeronautic industry of the United States will tend to monopolize world markets heretofore supplied by French and English industries. The same newspaper mentions that the important competition of the United States is already making itself felt in South America.



DROPPING THE PILOT.—Sq. Ldr. de Haga Haig in the D.H.53 ready to be dropped from H.M. Airship R.33.



THE PILOT. DROPPED. Sq. Ldr. De Haga Haig and the D.H.53. after landing from the R.33. The clumsiness of the attaching tackle, as compared with that used by the U.S. Army in the experiments with the Sperry Messenger, is noticeable. It is typical of the ideas of Air Ministry Experts.

German views regarding the recent British naval maneuvers in the Baltic Sea and the British blockade against Russia

[From the German press]

We hear from influential circles that the tension between London and Moscow has grown so acute as to seriously endanger the relations between the two countries. The problem of European security is considered by British political circles as less important than the existing strain between the British and Moscow Governments. The declarations of British ministers, especially Lord Birkenhead, point to the possibility of a breach of diplomatic relations. The extreme elements in Moscow, who are all definitely in favor of a breach with England, have acquired an influence which is still steadily growing. According to information received here, Moscow susceptibilities have been much ruffled by the conduct of the conservative British Cabinet, especially since Baldwin canceled all the verbal and written promises made by Chamberlain touching the regulation of the British-Russian relations. On the other hand, the Soviet Government has been actively supporting the anti-British movement in China for many weeks. British Government circles hold the opinion that General Feng is supported by official Moscow organs. In several manifests to the people he openly declares that he intends to conduct a race war against Great Britain and Japan, not only in behalf of China but also of another friendly power. The cable reports received here from Shanghai afford ample proof of Moscow cooperation in the strike disorders in Shanghai and other Chinese towns.

The Paris correspondent of the socialistic Daily Herald informs us of the misgivings aroused in French naval circles by the British maneuvers in the Baltic and especially in the Jutland waters near the island of Oesel. The French Admiralty is in possession of reports concerning the English dredging operations near the Jutland coast. They have not as yet formed an opinion upon the subject, but they suppose this work to be a preparatory measure for an industrial-blockade war against Russia. It is clear that the occupation of the Baltic and Jutland coast would be regarded in England as a very great success against the soviets.

The soviets have answered this challenge in their usual manner—by spreading pamphlets on board the British warships, in which the men are urged to rise up against their officers. In Riga the British authorities succeeded in discovering the tracks of soviet propagandists who were spreading pamphlets among the crew of the *Cleopatra*, the publications having been smuggled into the town with the diplomatic post from Moscow.

Efforts are being made both here and in Moscow to avoid an open breach. The soviet representative Rakowsky is expected shortly in

London and will endeavor to patch up the Russian-British relations. Diplomatic circles in this country seem, however, very doubtful as to the success of this attempt, because ever since the events in China are following the course favored by the soviets, there is a distinct tendency in Moscow toward a more extremist policy, with its inevitable consequences of a breach with England.

Notes on education of Royal Air Force officers

[Source M. I. D.]

The present policy of the Royal Air Force is to endeavor to educate as many officers as possible in technical subjects, such as wireless, air dynamics, airplane designing, and engine designing and testing.

When an officer has finished one of these courses he has a letter placed in front of his name. An E signifies a qualified engineering officer. An S signifies a qualified signal officer who has passed a university course in electrical engineering, etc.

The endeavor seems to be to have officers qualify in as many technical courses as possible. The writer has questioned several authorities on the practicability of making technicians or engineer officers in the manner now being pursued by the R.A.F., and these authorities all appear to be unanimous in the belief that a man can not serve for five or six years as an airplane pilot and then be made an engineer by sending him to an engineering college.

The superintendent of the royal airplane establishment at Farnborough is quite positive that the present policy of the air force regarding engineering officers can never be successful in turning out good engineers. He states that in the first place it is difficult to get a man to learn the fundamentals of the subject after he has had five or six years of ordinary duty in a squadron. In the second place it is impossible to have him keep up in engineering work if he is going to be detached from this work from time to time to be sent to some out-of-the-way post overseas where he has nothing but routine flying duties to perform.

He believes the only practical method to deal with the subject is to establish a corps of engineers for the air force. This corps of engineers, he thinks, should be similar to the engineering corps in the Royal Navy. The engineering corps in the Royal Navy is composed of men who have had excellent records in the Naval College at Dartmouth. After they have finished their course at Dartmouth they are put through an apprenticeship in the shops of the various

navy yards. In this way they are given an opportunity to learn all about their profession, and their education along this one line is progressive and continuous.

For some reason the Royal Navy line officers look down on the engineer officers as being of a lower type. An effort is being made to break down this prejudice, but with small results. For this reason it has been found practically impossible to get graduates of the naval college at Dartmouth to choose to be engineer officers, and as a result the Royal Navy has had to take in likely young civilians and educate them at their engineering college at Keyham.

Due to this prejudice, the corps of naval constructors, on the other hand, is composed entirely of civilians who will not accept commissions in the navy. These naval constructors are put through the naval college at Greenwich, and this college also educates a number of naval architects who do not intend to work for the navy but for civilian firms doing naval construction.

From the above it can be seen that the Royal Navy does not attempt to make engineering officers out of line officers.

The superintendent of the royal aeronautical establishment does not recommend that engineering officers do no flying duty, but should do only just enough such duty to keep in intimate touch with the needs of their service.

Similar views are held by designers at Fairey's, DeHavilland's, and several other places that have been questioned on this matter. The manufacturers claim that it is often difficult to deal with the department of supply and research because the members of that department are not really first-class engineers. The result is that the members of this department, who know less than the majority of designers and constructors in the aircraft business, are continually attempting to supervise and regulate these designers and constructors, with the result that the airplanes turned out in Great Britain are practically all of mediocre caliber. The airplanes are never totally bad, but except where a designer completes his design independent of Air Ministry supervision they are never really good.

Report on imperial airways agreement for Indian mail service

[From a consular report]

As a result of a trip made to India last winter by Sir Sefton Brancker, air vice marshal, who was piloted by Alan Cobham, and a survey of the route from Egypt to India last September, it was announced in the House of Commons on December 16, 1925, by Sir

Samuel Hoare, Secretary for Air, that an agreement had been reached between the Air Ministry and the Imperial Airways Limited for the establishment of a regular air service between Egypt and India by the Imperial Airways Limited. According to the terms arrived at the Imperial Airways Limited are to maintain a regular fortnightly service with three-engined planes for the transportation of mail, freight, and passengers in each direction by the way of Bagdad and Basra. The amount of the subsidy is dependent upon the number of flights successfully completed, but the maximum amount that can be earned on each half of the route is £93,600. The agreement is made for a period of five years.

As it has been practically certain for the last six months that the contract would eventually be awarded to the Imperial Airways Limited, this company has gone ahead with the order of several planes. At the time of the placing of these contracts a description of the planes was given in the aviation section of the monthly report from this consulate general.

Owing to the time which will be necessary for the construction of planes and also for the preparation of suitable landing fields, it is thought that this service can not be inaugurated before the fall of 1926.

Another long-awaited announcement concerning the Imperial Airways, made known at the same time as the Egypt-India plan, was to the effect that the original agreement with the Imperial Airways Limited is to be modified in some important points. Whereas under the original agreement with the Imperial Airways Limited a subsidy was paid on the basis of the number of miles flown, the new agreement provides for converting the required mileage of 1,000,000 miles per annum to a composite requirement of 425,000 horsepower miles per annum. The purpose of the modification is to encourage the use of three-engined planes, or, in other words, to give an impetus to the development of commercial aircraft, and, incidentally, to bring the equipment of the Imperial Airways Limited up to date. Up to the present time neither agreement has been signed, but the papers are in process of preparation and the original agreement has been initialed by representatives of both parties concerned.

In this connection it is interesting to note that Mr. Cobham, the man who piloted the machine on a preliminary survey of the Egypt-India route, is now on a survey trip from Cairo to Cape Town. It is learned from an official of the Imperial Airways Limited that this trip, like its predecessor, is for the purpose of determining the practicality of the establishment of a regular Cairo-Cape Town service by the Imperial Airways Limited.

New Zealand's naval air base

[From a consular report]

The Minister of Defense of New Zealand has announced the purchase by the Government of a site for an airplane and seaplane base at Upper Waitemata, about 6 miles from Auckland. The air base is 167½ acres in area and is said to have all the qualifications for a first-class landing ground. There is a frontage of a mile and a half on the harbor and at low tide there is ample room for maneuvering seaplanes. The property is sheltered and there are no high hills in the vicinity. It is intended as a naval base and will be occupied when certain clearing work is completed.

The permanent air force of New Zealand consists of 4 officers and 11 of other ranks, with 104 territorial officers. During the last year 40 of the latter were called for refresher courses, and the number was limited, owing to the shortage of machines. The training consisted of dual and solo flying on Auros, Bristol Fighters, D. H. 4's, and D. H. 9's, and courses in ground work. Two Bristol Fighter airplanes and six Auro airplanes have been ordered and are expected to arrive soon. Other equipment has been purchased for the use of the air force.

Change in precedence of British consuls general

[Source official]

The following recent changes in precedence of British consuls general in relation to officers of the British naval, military, and air forces have been made:

Consuls general:	
Rank with but after	Rear admirals. Major generals. Air vice marshals.
Consuls:	
Rank with but after	Captains, R. N. Colonels. Group captains in the air force.
Vice consuls:	
Rank with but after	Lieutenant commanders. Majors. Squadron leaders in the air force.
Consular agents:	
Rank with but after	Lieutenants, R. N. Captains in the army. Flight lieutenants.

It will be observed from this schedule that consuls general have been advanced in the table of precedence and that their present status entitles them to a salute of 13 instead of 11 guns.

HUNGARY

CONSTRUCTION OF DANUBE PORT AT BUDAPEST

[Source M. I. D.]

The construction of the Danube port at Csepel, at the northern end of Csepel Island, immediately to the south of Budapest, in the dead branch of the Danube, by the French Schneider Creuzot firm is proceeding at a moderate rate.

Two ports are being built—an oil port and a commercial port.

The oil port is ready and is in use. Of the six blocks available for distilleries, etc., four are occupied, of which three are in operation.

As regards the commercial port, one of the three planned arms of the port is expected to be opened some time in March, 1926. (It should have been ready December 20, 1925.) One side of this will be occupied by granaries, grain elevators, etc.; the other equipped for the handling of iron ore, coal, and similar commodities. A traffic bridge of reinforced concrete over this arm is completed and is in use. Another bridge is planned at the northern end of the island.

The oil port is a necessity for Budapest, and is of great importance, since all the raw oil, gasoline, etc., used in Hungary is imported from Rumania or Russia.

Regarding the commercial port, it is believed that unless a dock will be built at the entrance of the port, permitting loading and unloading at all water levels, possible by mechanical means, the port will remain of little importance for Budapest, especially since it is too far, and will be used mainly for transit traffic only.

The importance of the port in general was probably overestimated at the time the contract was signed, the work is proceeding rather slowly, and one hardly ever hears of its progress here.

Competent shipping circles in Budapest are of the opinion that the opening of this port will not cause any material difference in the commerce of the Komarom and Bratislava ports or of other ports on the Danube.

ITALY

THE ARMSTRONG PLANT AT POZZUOLI

December, 1925

The Armstrong plant at Pozzuoli (near Naples) now has 1,400 employees, the full capacity force being 2,600. Most of the work in hand now is for merchant shipping, consisting principally of crank shafts, propeller shafting, bearings, and seven Diesel engines for motor ships. The Diesel engines are in the early stages of construction, and the exact type was not ascertained. An engineer of the company stated that they are to be of a standard design supplied to the Armstrong Co., and are for slow cargo motor ships, which are being built at Monfalcone.

The principal ordnance projects under way at the plant are:

(*a*) The conversion of three turrets from hydraulic to electric power. These turrets have twin mounts for guns of approximately 15-inch caliber.

(*b*) Building eight 4.7 gun mounts for destroyers of the *Sella* class.

(*c*) General overhaul of about 100 fieldpieces (guns and carriages) that were captured from the Austrians during the World War.

(*d*) Relining three large naval guns of about 15-inch caliber.

It is understood that the three 15-inch turrets and barbettes mentioned in the preceding paragraph were taken from a ship called the *Caracciolo*, which was never completed; but which is now at Baia, and is being scrapped gradually. It was stated that these turrets are to be installed in the coast defense of Spezia.

It has been inferred from a conversation with engineers of the Armstrong plant that a considerable number of guns similar to these will be used to fortify the island of Kasos, the southernmost of the Dodecanese group. No corroboration of the existence of such a project is available.

Experiments have been conducted on a 4.7 55-caliber A. A. gun, fitted with a system for quickly relining the gun on the spot without dismounting it. It is understood that this system can be applied to guns up to 6-inch caliber. This system is the invention of Commander Pittoni and is known as the Pittoni system.

In the experiments conducted at Pozzuoli 70 shots (pressure of about 20 tons per square inch) were fired, during which time the

liner was changed 10 times. The time required to reline the gun was about 30 minutes. As far as could be ascertained, the general features of this system are:

(*a*) A comparatively thin liner of a special nickel-chrome steel.

(*b*) Bearing surface between liner and jacket at breech and muzzle only (about 4 inches), with a clearance of about two one-thousandths of an inch throughout the rest of the length.

(*c*) Studs and dogs for loosening the old liner and for forcing the new liner into position.

It is understood that the British Government is interested in the Pittoni system for relining guns and that the Armstrong Co. has submitted an offer to the British Government to supply one gun of intermediate size with extra liners. The conditions stipulated are that, in case the tests are satisfactory, the British will pay £20,000 sterling for the design, data, and specifications, and guarantee the company one-third of the orders for guns of that size for a period of five years. If the gun proves unsatisfactory the British Government will pay the actual cost incurred by the company, not exceeding £3,000. It is further understood that an offer similar to the above has been made to Japan.

The Armstrong Co. has recently built a 4.7-inch gun consisting of one-piece jacket and a liner (so-called monobloc construction). The jacket of this gun has a constant slope of 4:1,000 from the forward end of the powder chamber to the muzzle. It was fired twenty-seven times at Pozzuoli and then sent to Spezia for official tests. The engineers stated that, in their opinion, this type of construction could not be used for guns greater than 6-inch caliber.

A number of heavy fieldpieces with caterpillar tractors were at the plant. It was stated that these had been brought there recently for the purpose of drilling the troops in embarking for overseas service by actually embarking and stowing such equipment on board vessels which are sent to the company's pier for that purpose.

ITALY

ACTIVITIES AT DORNIER SEAPLANE PLANT

Aircraft now under construction

(A) FOR THE CHILIAN NAVY

Four Dornier-Wahl seaplanes equipped with two Rolls-Royce engines. The construction on these is about 75 per cent complete. Two Chilian naval aviation officers (lieutenant commanders) are

stationed at the plant for the purpose of observing the construction. The planes will be flight tested at Marina di Pisa and then shipped to Chile. They are to be used for observation and light bombardment. Two twin-mounts (one forward and one aft) for Lewis machine guns are being installed. Bomb racks will be installed (probably attached to the sides of the boat hull), after arrival in Chile.

(B) FOR SOVIET RUSSIA

Two Dornier-Wahl seaplanes. These are the same as building for Chile, except that it could not be ascertained what type of engines will be used, as the Dornier authorities were loath to give information in regard to the work which they are doing for Russia. These two planes are approximately 50 per cent complete.

(C) FOR THE ITALIAN COMMERCIAL AIR LINE, ROME-GENOA-BARCELONA

Seven Dornier-Wahl commercial seaplanes (equipped with two Jupiter engines).

The first three of these planes will be delivered before the end of this month.

Two submarine planes have been completed, but the maneuverability on the water, with the La Rhône engines, was unsatisfactory. The La Rhônes are to be replaced by some other type of engine, not yet decided upon. It has also been decided to dismount the monoplanes entirely for storage in a submarine tank, instead of folding them back. This is to permit of storage in a smaller tank. It is not known whether or not a submarine has been fitted with a tank or when tests will be conducted.

Twelve Dornier-Wahl seaplanes have already been delivered to Spain. The last one of these was equipped with Napier Lion engines and is expected to attempt a flight across the Atlantic to South America.

The Dornier plant is now working to capacity and the authorities state that an addition to their plant will be built in the near future.

According to the authorities at Pisa, Dornier planes are now being built in Japan. The number and types under construction could not be ascertained. It was stated that Dornier engineers are in Japan superintending the construction, and that none of those who have been sent to Japan have returned as yet. It was further stated that no skilled metal workers had been sent to Japan, as the Japanese workmen could do the work satisfactorily under the supervision of the Dornier engineers. This statement may be doubted, however. The Dornier Co. brought a nucleus of skilled workmen to Italy when the Dornier branch was established at Marina di Pisa.

ITALY

MISCELLANEOUS NOTES

[Source reliable]

Organization of battle fleet

A decree of the minister of marine establishes the organization of the battle fleet as follows:

(*a*) One division of battleships.

(*b*) One squadron of light cruisers.

(*c*) One division of destroyers.

(*d*) One high submarine command (immediately under the chief of general staff).

(*e*) One flotilla of MAS (antisubmarine craft).

Guns for cruisers "Trento" and "Trieste"

The 8-inch 50-caliber guns for the new 10,000-ton Italian light cruisers *Trento* and *Trieste* are being made at the gun factory of Ansaldo & Co., at Cornegliano (Liguria). These guns are being made in one piece, the billets for which are forged at the steel foundry of Ansaldo & Co., which is also at Cornegliano (Liguria).

The guns were probably turned with a slight taper, but it is so slight that to the eye it appears cylindrical. The diameter at the breech is carried forward half the length of the gun and is then filleted down to the muzzle diameter.

Responsibility for accident to "Miraglia"

The Ministry of Marine has issued the following statement:

On November 28, 1925, at 7.40 a. m., the aircraft carrier *Miraglia*, in an advance stage of construction, at anchor in the internal dock of the arsenal at Spezia, capsized to port and was almost entirely submerged.

This deplorable event can not be attributed to an act of God. It was due to lack of proper precaution during exceptionally adverse weather conditions.

Rear Admiral Edoardo Ruta, in command of the arsenal, and General Curio Bernardis, chief of naval construction at Spezia, have therefore been relieved of their respective charges and are placed at the disposal of the ministry.

The responsibility will be strictly determined when, the vessel having been restored to its former condition, it will be possible to know the exact causes of the accident.

The *Miraglia* is the only aircraft carrier owned or being built by Italy.

NOTE.—In United States nomenclature she would be called a tender.

Torpedo boat and auxiliary ship stricken from the list

In accordance with a royal decree, the torpedo boat *Rismondo* and the auxiliary ship *Bengasi* have been stricken from the list.

Notes on Girardelli fire-control system

The latest type of the Girardelli system (second modification of the type bought by the United States Navy) will be given official tests by the French Navy. The French have installed three systems (Girardelli, Bréguet, and Chotter Arlé) on board the cruiser *Pothuau* for competitive tests under identical conditions. Signor Girardelli states that recent preliminary competitive trials indicated that his system is far superior to the others. The official tests are scheduled to be held at Toulon, beginning December 10. Signor Girardelli is affiliated with the Chantier de la Soir Co., and is confident that the French will adopt his system as a result of the forthcoming competitive tests.

Signor Girardelli states that, in view of the extensive modifications and improvements incorporated in his latest model, it would be necessary to practically rebuild the old set which he supplied to the United States Navy in order to obtain results comparable to the results which may be obtained with his new apparatus. He has promised to supply all available data pertaining to the results obtained in the tests of his apparatus on the *Pothuau*, and also with a detailed explanation of the differences between the set supplied to the United States Navy and the latest model.

The following information pertaining to the interest shown by Japan in the Girardelli fire-control (director) apparatus is furnished:

About two months after Commander Hishikawa and Lieutenant Murakami, I. J. N., inspected the Girardelli apparatus (see May, 1925, Bulletin), Signor Girardelli received a telegram from the Japanese naval attaché at Rome, quoting a dispatch from Tokyo, to the effect that the Imperial Japanese Navy had decided to adopt the Girardelli apparatus.

Signor Girardelli states that as yet no agreement has been negotiated for the supply of the apparatus to Japan. He suspects that the Japanese are waiting for the result of the competitive tests by the French, before negotiating any definite agreement.

It is stated that the Girardelli Co. will be merged with the Ansaldo-San Giorgio Co. The Italian Navy has recently negotiated a contract for Girardelli fire control, to cost 10,000,000 lire. Informant states that this contract has not yet received the final approval of the Government, but that he is confident that it will be approved.

Judging from the amount mentioned, it appears probable that the contract is for two of the Girardelli sets, and it is thought that they might be for the cruisers *Trento* and *Trieste*. No corroboration of this is available, however.

The Caproni "Ca–70" for ground attack and night pursuit

The characteristics of the Caproni *Ca–70* for ground attack and night pursuit are as follows:

Weight, empty	[1] 1,300 kg. (2,860 pounds).
Useful load	800 kg. (1,804 pounds).
Total weight	2,120 kg. (4,664 pounds).
Span, upper wing	14 m. (45.92 feet).
Span, lower wing	8 m. (26.24 feet).
Wing chord	2.5 m. (8.20 feet).
Maximum speed	200 km. (125 miles).
Minimum speed	90 km. (56 miles).
Factor of safety	10.

Armament.—Five machine guns (one front, one double mount firing down and forward, and one double mount firing down aft).

The fuselage is shaped like a boat hull and is protected by bullet-proof "Poldi" plates. The power plant may be either the Jupiter or the Lorraine-Dietrich engine. The crew for ground attack is two, for night pursuit is one.

In view of the very low fuselage, this machine (like the *Ca–72*, *73*, and *80*) will not be particularly good for landing on rough ground.

Caproni "Ca–73" night bomber

Trials are now being conducted on the Caproni *Ca–72* and *Ca–73* night bombardment airplanes. These planes are the same as the *Ca–80*, except that the *Ca–72* is equipped with the two Lorraine-Dietrich 450-horsepower engines and the *Ca–73* is equipped with two Asso 500-horsepower engines. On page 20, December, 1925, BULLETIN, it was stated that this plane, equipped with two Asso engines, would be known as the *Ca–72* bis. This designation has been changed to *Ca–73*.

As previously stated, the Air Ministry has ordered nine *Ca–72's* for service trials. The negotiations for 50 *Ca–73's* have not yet been concluded.

Notes on Fiat "A–20," "A–22," and "A–25" engines

The following characteristics and actual performance data for the *A–20* engine and the characteristics and predicted performance data of the *A–22* and *A–25* engines have been obtained from the authorities of the Fiat Co. The first *A–20* has completed the bench test. The *A–22* and *A–25* are now ready for tests.

GENERAL CHARACTERISTICS AND PERFORMANCE DATA OF FIAT "A–20" ENGINE

International h. p. at 2.060 r. p. m., h. p. 410.
Type of engine, V, 60°, water cooled, direct drive.
Number of cylinders, 12.
Length of engine, m. 1.455.
Width of engine, m. 0.645.
Height of engine, m. 0.845.
Diameter of piston, mm. 115.
Stroke, mm. 150.
Compression ratio, 5.8.
Volume of piston displacement, liters 1.558.
Total cylinder volume, liters 18.696.
Angle of cylinders, 60°.
Normal h. p. at 2.200 r. p. m., h. p. 430.
Maximum h. p. at 2,400 r. p. m., h. p. 455.
Economic number of r. p. m., 2,060.
Ignition system, high tension, Marelli, double for each cylinder.
Type of oil pump, gear pump.
Maximum temperature of oil on entering engine, 48° centigrade.
Maximum temperature of oil on leaving engine, 60° centigrade.
Oil pressure, 7 to 8 atmospheres.
Oil consumption, gr./h. p. 10.
Type of water pump, centrifugal.
Maximum temperature of water, 75° to 80° centigrade.
Capacity of cylinders (water jackets), liters 10.
Weight of engine, including propeller hub and starter, but without water, kg. 310.
Weight of engine, complete, with water, kg. 320.
Gasoline consumption at 2,050 r. p. m. (370 h. p.), gr./h. j. hr. 205.
Gasoline consumption at 2,060 r. p. m. (410 h. p.), gr./h. p. hr.,220.
Gasoline consumption at 2,200 r. p. m. (430 h. p.), gr./h. p. hr. 220.
Gasoline consumption at 2,400 r. p. m. (455 h. p.), gr./h. p. hr. 225.

GENERAL CHARACTERISTICS AND EXPECTED PERFORMANCE OF FIAT "A–22" ENGINE

Engine power, h. p. 500 to 525.
R. p. m., 2,000.
Average velocity of piston at 2,000 r. p. m., 10.7 m/sec.
Number of cylinders, 12.
Bore, mm. 135.
Stroke, mm. 160.
Total cylinder volume, liters 27.5.
Compression ration, 5.3.
Actual average pressure, 8.6 atmospheres.
Total weight of engine, empty, kg. 400,

Total weight of engine, with water, kg. 425.
Fuel consumption per h. p./hr., kg. 0.235.
Oil consumption per h. p./hr., kg. 0.015.
Weight per h. p. engine, dry, kg. 0.76.
Weight per h. p. engine, with water, kg. 0.81.
Lubrication system, forced lubrication.
Ignition system, high tension, double for each cylinder.
Number of spark plugs per cylinder, 2.
Number of valves per cylinder, 4.
Number of carburetors, 2, double.

Remarks.—The weight of engine, empty, includes the propeller hub, the engine starter, the connections for the revolution counter, and for the machine-gun synchronizer and the gasoline pump.

ACTUAL CHARACTERISTICS AND EXPECTED PERFORMANCE OF FIAT "A-25" ENGINE

Engine power, h. p. 50 to 800.
R. p. m., 1,800.
Average velocity of piston at 2,000 r. p. m., 12 m/sec.
Number of cylinders, 12.
Bore, mm. 170.
Stroke, mm. 200.
Total cylinder volume, liters 54.5.
Compression ratio, 5.
Actual average pressure, 7.5 atmospheres.
Total weight of engine, dry, kg. 750.
Total weight of engine, with water, kg. 780.
Weight per h. p., engine, dry, kg. 0.94.
Weight per h. p., engine, with water, kg. 0.975.
Fuel consumption per h. p./hr. kg. 0.240.
Oil consumption per h. p./hr. kg. 0.020.
Lubrication system, forced lubrication.
Ignition system, 4 high tens. magn.
Number of Spark plugs per cylinder, 4.
Number of valves per cylinder, 4.
Number of carburetors, 3, double.

Remarks.—The weight of the engine, empty, includes the propeller hub, the engine starter, the connections for the revolution counter, and for the machine-gun synchronizer and the gasoline pump.

Two seaplanes crash in Alps

The two Macchi–24 torpedo and bombing seaplanes which started on September 17 to make a propoganda flight through northern Europe, crashed on November 11 in the Alps Mountains, a short distance from the Italian-Swiss frontier.

These planes had accomplished the flight through northern Europe and were returning to Italy. While crossing the Alps they ran into a storm which forced them to land in the mountains. The planes were wrecked but none of the seven members of the crews were seriously injured.

Order of precedence of Italian ministers

1. Ministry of Foreign Affairs.
2. Ministry of Home Affairs.
3. Ministry of the Colonies.
4. Ministry of Justice.
5. Ministry of Finance.
6. Ministry of War.
7. Ministry of Marine.
8. Ministry of Aeronautics.
9. Ministry of Public Instruction.
10. Ministry of Public Works.
11. Ministry of National Economy.
12. Ministry of Communications.

Broadcasting station at Zagabria

The Italian press announces that a broadcasting station has been established at Zagabria (Yugoslavia) which will begin working for the public by March, 1926.

The naval radio station at Balad (Italian Somaliland) has been closed by the Ministry of Marine.

Notes on proposed army reorganization

Premier Mussolini has made a bill for the reorganization of the army which provides for an increase of one army corps from 10 to 11. The Ternal Division, consisting of one infantry brigade of three regiments and one regiment of field artillery, will be adopted. The brigades will consist of three regiments instead of two. The period of service will be for 18 months, as at present, but there is a minimum of six months' service allowed for men in certain categories to be announced later who have had preliminary military instruction. The infantry will be divided into small units armed with the latest weapons, while the present regiments of the Bersaglieri will be armed with machine guns. The light and heavy field artillery regiments will be increased. The number of officers will not be decreased and promotion in the junior grades will be made more rapid. The change to the new organization will take place gradually.

The National (Fascist) Militia, which is employed in guarding railways, ports, post, telegraph and telephone offices, and in escorting railway trains, will continue and increase its functions.

JAPAN

ORGANIZATION OF FLEET

December, 1925

[Source reliable]

First fleet:
- First division. *Nagato, Yamashiro, Fuso, Ise.*
- Third division. *Kinu, Abukuma, Jintsu, Naka.*
- First destroyer squadron, *Yubari*, flagship.
  - Thirteenth division, *Nos. 2, 4, 6, 8.*
  - Twenty-sixth division, *Kaki, Nire, Toga, Kuri.*
  - Twenty-seventh division, *Hishi, Sumire, Warabi, Ashi.*
  - Twenty-eighth division, *Tade, Hasu, Yomogi.*
- First submarine squadron, *Kitagami*, flagship: *Jingei*, tender
  - Sixth division. *Ro–57, Ro–58, Ro–59.*
  - Twenty-fourth division, *Ro–63, Ro–64, Ro–68.*
  - Twenty-sixth division, *Ro–60, Ro–61, Ro–62.*

Second fleet:
- Fourth division, *Kirishima, Hiei.*
- Fifth division. *Yura, Natori, Sendai.*
- Second destroyer squadron, *Isuzu*, flagship.
  - Third division, *Shiokaze, Shimakaze, Nadakaze, Yukaze.*
  - Fifth division, *Nos. 3, 5, 7, 9.*
  - Twenty-ninth division, *Nos. 11, 13, 15, 17.*
- Second submarine squadron, *Chogei*, tender.
  - Fourteenth division, *Ro–26, Ro–27, Ro–28.*
  - Seventeenth division, *I–51, I–52.*

Attached to the fleet:
- First mine sweeper division, *Nos. 1, 2, 3, 4.*
- *Hosho* (airplane carrier).
- *Shiriya, Notoro* (tankers).
- *Mamiya* (food supply ship).

First foreign service squadron, *Tone, Ataka, Uji, Fushimi, Sumida, Saga, Seta, Katata, Hira, Hotsu, Toba, Hirato*, fifteenth destroyer division (*Hagi, Susuki, Fuji, Tsuta*).

Training squadron, *Yakumo, Idzumo* (expected to be organized in January).

Ships on Guard Duty, Naval Stations

The following information shows the ships assigned to guard duty at the various Japanese naval stations as of December 1, 1925. The names of all ships attached to the various Japanese naval stations and their status is not known at present.

TRAINING SHIPS ATTACHED TO SCHOOLS

Kongo, Yahagi, Kiso, Kasuga.

SHIPS ON GUARD DUTY AT VARIOUS STATIONS

Yokosuka: *Aso.*
First destroyer division, *Nokaze, Numakaze, Namikaze, No. 1.*
Second mine sweeper division, *Yudachi, Yugure, Kamikaze Hatsushimo, Kisaragi, Hibiki.*
Kure: *Katsuriki, Kiso* (additional assignment).
Eighteenth destroyer division, *Amatsukaze, Tokitsukaze, Isokaze, Hamakaze.*
Sixth mine sweeper division, *Uranami, Isonami, Minazuki, Ayanami, Nagatsuki, Kikuzuki.*
Sasebo: *Tatsuta, Wakamiya.*
Eleventh mine sweeper division, *Ushio, Nenohi, Harukaze, Asakaze, Wakaba, Hatsuyuki.*
Twenty-second submarine division, *Ro–23, Ro–24.*
Twenty-third submarine division, *Ro–3, Ro–4, Ro–5.*
Maidzuru: *Nisshin.*
Ninth destroyer division, *Kuwa, Maki, Keyaki, Tsubaki.*
Bako: *Nagara, Komabashi.*
Fourteenth destroyer division, *Kawakaze, Tanikaze, Kiku, Aoi.*
Twenty-fifth submarine division, *Ro–29, Ro–30, Ro–32.*
Chinkai:
Twenty-fourth destroyer division, *Momo, Yanagi, Kashi, Hinoki.*
Ominato: *Otomari.*
Fourth destroyer division, *Hakaze, Akikaze, Tachikaze, Hokaze.*

Ships in Reserve, Naval Stations

The following list of ships in reserve classified by naval stations is believed to be reliable:

At Yokosuka: *Haruna, Chikuma, Chihaya, Matsuye.*
Second destroyer division, *Yakaze, Sawakaze, Okikaze, Minekaze.*
Sixth destroyer division, *Ume, Katsura, Kayede, Kusunoki.*
Seventh destroyer division, *Sugi, Matsu, Sakaki, Kashiwa.*
First submarine division, *Ha–1, Ha–2.*
Second submarine division, *Ha–9, Ha–10.*
Third submarine division, *Ro–13, Ro–12, Ro–11.*
At Kure: *Hyuga, Oi, Chitose, Kuma, Tama, Akashi, Yamato, Yodo.*
Sixteenth destroyer division, *Nos. 10, 12, 16, 18.*
Seventeenth destroyer division, *Umikaze, Yamakaze, Nara.*
Twelfth sumbarine division, *Ha–3, Ha–4, Ha–5.*
Thirteenth submarine division, *Ha–6, Ha–7, Ha–8.*
Ro–52, unassigned.
At Maidzuru: *Adzuma, Enoki.*
At Sasebo: *Mutsu, Tokiwa, Tsushima, Mogami.*
Twenty-first destroyer division, *Sakura, Tachibana, Kaba, Kiri.*
Twenty-fifth destroyer division, *Nashi, Take, Momi, Kaya.*
Twenty-first submarine division: *Ro–1, Ro–2, Ro–25.*

NOTE.—It is not known at present which of the above ships are in special reserve with reduced complement.

The following organization changes, reliably obtained, should be noted:

(*a*) The twenty-third destroyer division has been renumbered the seventh destroyer division.

(*b*) The twenty-second destroyer division has been renumbered the sixth destroyer division.

(*c*) The twenty-ninth destroyer division consists of destroyers *Nos. 13*, *11*, *15*, and *17*.

(*d*) The submarine *Ro–52* is not assigned to any division.

(*e*) The twenty-first submarine division consists of the submarines *Ro–1*, *Ro–2*, and *Ro–25*.

Location of Naval Vessels

January 9, 1926

At Yokosuka: *Chihaya, Chikuma, Haruna, Yakumo, Manshu, Kongo, Aso, Kasuga, Nagato, Yamashiro, Kitagami, Jingei, Isuzu, Hosho.*

Sixth destroyer division, *Ume, Katsura, Kayede, Kusunoki.*

Seventh destroyer division, *Sugi, Matsu, Sakaki, Kashiwa.*

Second destroyer division, *Yakaze, Sawakaze, Okikaze, Minekaze.*

First destroyer division, *Nokaze, Namikaze, No. 1, Numakaze.*

Third destroyer division, *Nadakaze, Shiokaze, Shimakaze, Yukaze.*

Fifth destroyer division, *Nos. 7, 3, 5, 9.*

Urakaze, Shiratsuyu, Mikazuki.

First submarine division, *Ha–1, Ha–2.*

Second submarine division, *Ha–9, Ha–10.*

Third submarine division, *Ro–13, Ro–12, Ro–11.*

Fourth submarine division, *Ro–55, Ro–54, Ro–56.*

Fifth submarine division, *Ro–22, Ro–21, Ro–20.*

Sixth submarine division, *Ro–59, Ro–58, Ro–57.*

Unassigned, *Ro–4.*

Second mine sweeper division, *Kamikaze, Hatsushimo, Yudachi, Yugure, Kisaragi, Hibiki.*

First mine sweeper division, Mine sweepers *Nos. 4, 1, 2, 3.*

Musashi, Matsuye, Naruto, Kamoi, Fuji, Shiriya, Susaki, Seito, Takasaki.

%Kaga % submarine *I–58.*

At Ishikawajima, *%* destroyer *No. 25.*

At Uraga, *%* destroyer *No. 23.*

At Ominato, *Otomari.*

Fourth destroyer division, *Tachikaze, Hakaze, Akikaze, Hokaze.*

At Kure: *Akashi, Chitose, Yodo, Kuma, Asama, Tama, Tenryu, Oi, Hyuga, Kiso, Karasaki, Yahagi, Katsuriki, Fuso, Ise, Kinu, Abukuma, Jintsu, Naka, Chogei.*

Seventeenth destroyer division, *Umikaze, Yamakaze, Nara.*

Sixteenth destroyer division, *Nos. 12, 18, 16, 10.*

Eighteenth destroyer division, *Isokaze, Tokitsukaze, Amatsukaze, Hamakaze.*

Thirteenth destroyer division, *Nos. 4, 6, 2, 8.*

Twelfth submarine division, *Ha–3, Ha–4, Ha–5.*

Thirteenth submarine division, *Ha–6, Ha–7, Ha–8.*

Eleventh submarine division, *Ro–58, Ro–51.*
Fifteenth submarine division, *Ro–14, Ro–16, Ro–15.*
Sixteenth submarine division, *Ro–17, Ro–18, Ro–19.*
Fourteenth submarine division, *Ro–27, Ro–26, Ro–28.*
Seventeenth submarine division, *I–52, I–51.*
Unassigned, *Ro–52.*
Sixth mine sweeper division, *Isonami, Kikuzuki, Minazuki, Nagatsuki, Ayanami, Uranami.*
Noma, Muroto, Tsurugizaki, Settsu, Yamato, Koshu, Asahi, Ondo, Mamiya, Iro, Nojima.
% Akagi, % I–53, % I–55.

At Osaka: destroyer *No. 27.*
At Kobe: *% Kako, %* submarines *Ro–31, I–1, I–2, I–3, Ro–65.*
At Maidzuru: *Adzuma, Nisshin, Enoki.*
Ninth destroyer division; *Kuwa, Keyaki, Tsubaki, Maki.*
At Sasebo: *Mogami, Tokiwa, Tsushima, Idzumo, Mutsu, Tatsuta, Wakamiya, Yubari, Kirishima, Hiyei, Natori, Yura, Sendai.*
Twenty-first destroyer division, *Kiri, Tachibana, Kaba, Sakura.*
Twenty-fifth destroyer division, *Momi, Take, Nashi, Kaya.*
Twenty-sixth destroyer division, *Nire, Kuri, Toga, Kaki.*
Twenty-seventh destroyer division, *Hishi, Sumire, Warabi, Ashi.*
Twenty-eighth destroyer division, *Yomogi, Hasu, Tade.*
Twenty-ninth destroyer division, *Nos. 13, 11, 15, 17, No. 21.*
Twenty-first submarine division, *Ro-1, Ro-2, Ro-25.*
Twenty-second submarine division, *Ro-24, Ro-23.*
Twenty-third submarine division, *Ro-3, Ro-5.*
Twenty-fourth submarine division, *Ro-64, Ro-63, Ro-68.*
Twenty-sixth submarine division, *Ro-61, Ro-60, Ro-62.*
Eleventh mine sweeper division, *Wakaba, Harukaze, Hatsuruki, Nasakaze, Ushio, Nenohi.*
Shikishima, Shiretoko Sata, Notoro, Hayatomo, Erimo, Tsurumi.
% destroyer, *No. 19.*

At Nagasaki: *% Furutaka.*
At Bako: *Komabashi, Nagara.*
Fourtheenth destroyer division, *Kawakaze, Tanikaze, Kiku, Aoi.*
Twenty-fifth submarine division, *Ro-29, Ro-30, Ro-32.*
At Chinkai:
Twenty-fourth destroyer division, *Kashi, Hinoki, Momo, Yanagi.*
At Port Arthur, *Hirato, Fuji.*
At Chinwangtao, *Susuki.*
At Chefoo, *Hagi, Tsuta.*
At Tsingtau, *Tone.*
At Shanghai, *Ataka, Toba, Hira.*
At Nanking, *Uji.*
At Wuhu, *Hotsu.*
At Kiukiang, *Fushimi.*
At Hankow, *Saga.*
At Changsha, *Sumida.*
At Ichang, *Katata.*
At Chungking, *Seta.*
Ships Enroute, *Iwate* left Freemantle on January 9 for Adelaide.

NOTES:

% indicates ships under construction and launched. Ships on the building ways not shown.

Vessels shown in this list and not in the three preceding ones are, with the exception of the 4th, 5th, 11th, 15th, and 16th submarine divisions, and noncombatant ships such as tankers, local station, training, repair, and survey vessels, in active commission and assigned to the respective yards for upkeep. The above submarines are in active commission but unassigned. *Ro-52* and *Tenryu* are undergoing repairs. Destroyer *No. 27* is still fitting out.

Expected dates of completion of ships

December 1, 1925

AIRPLANE CARRIERS

Type number and name	Where building	Per cent of completion		Expected date of completion
		Aug. 20, 1925	Sept. 20, 1925	
Kaga	Yokosuka	20.0	21.0	Mar. 31, 1927.
Akagi	Kure	52.0	55.0	Dec. 20, 1926.

CRUISERS

Kako	Kawasaki, Kobe	58.0	63.0	May 20, 1926.
Furutaka	Mitsubishi, Nagasaki	89.0	90.0	Apr. 30, 1926.
Kinukasa	Kawasaki, Kobe	4.0	5.0	Sept. 30, 1927.
Aoba	Mitsubishi, Nagasaki	4.0	6.0	Latter part Apr. 1927.
Myoko	Yokosuka	2.0	3.0	Latter part Mar. 1928.
Nachi	Kure	4.0	5.0	Do.
Ashigara	Kawasaki, Kobe	0.3	0.5	Unknown.
Haguro	Mitsubishi, Nagasaki	0.2	0.5	Do.
Naka	Yokohama Dock	90.0	93.0	Nov. 30, 1925.

DESTROYERS

No. 19	Sasebo	58.0	63.0	Mar. 25, 1926.
No. 21	Maidzuru	84.0	89.0	Nov. 30, 1925.
No. 23	Uraga Dock	42.0	46.0	Mar. 10, 1926.
No. 25	Ishikawajima	46.0	50.0	May 31, 1926.
No. 27	Fuji-nagata	85.0	91.0	Nov. 15, 1925.
No. 28	Uraga Dock	3.0	5.0	Apr. 30, 1927.
No. 29	Fuji-nagata	50.0	55.0	Latter part Apr. 1926.
No. 30	Ishikawajima	0.5	2.0	Latter part Dec. 1926.
No. 31	Maidzuru	1.0	3.0	Nov. 20, 1926.
No. 32	Sasebo	1.0	2.0	Latter part Mar. 1927.
No. 34	Fuji-nagata			
No. 11	Uraga Dock	92.0	98.0	Oct. 30, 1925.
No. 13	Ishikawajima	85.0	90.0	Nov. 30, 1925.

SUBMARINES

I-1	Kawasaki	88.0	92.0	Dec. 15, 1925.
I-2	do	67.0	70.0	Mar. 15, 1926.
I-3	do	48.0	50.0	May 31, 1926.
I-21	do	17.0	20.0	Nov. 30, 1926.
I-22	do	7.0	10.0	Apr. 15, 1927.
I-23	do	5.0	7.0	Apr. 30, 1927.
I-53	Kure	52.0	55.0	Aug. 31, 1926.
I-54	Sasebo	21.0	24.0	Apr. 29, 1927.
I-55	Kure	41.0	45.0	Nov. 30, 1926.
I-58	Yokosuka	27.0	30.0	Jan. 31, 1927.
Ro-31	Kawasaki	4.0	7.0	Do.
Ro-65	Mitsubishi, Kobe	41.0	45.0	May 31, 1926.
Ro-65	do	0.2	0.5	May 31, 1927.
Ro-67	do	16.0	20.0	Oct. 31, 1926.

[From the Japanese press]

Trials of the cruiser "Furutaka"

During the trials of the *Furutaka*, built by the Mitsubishi Dockyard Co., Nagasaki, engine trouble developed and as the repairs will not be completed until April 30, 1926, the crew who were sent to Nagasaki will be returned to Yokosuka.

Cruiser "Nachi" damaged by falling crane

On December 23, the Kure Navy Yard was engaged in installing a new 40-ton-capacity tower type crane to be used on the building ways on which the *Nachi* is being constructed, and while the base was being hoisted into place by means of two other cranes the bridge supporting these two cranes collapsed and both cranes fell from a height of 120 feet over on the *Nachi*, killing three workmen and injuring several others and also seriously damaging the *Nachi*. A board of investigation found the outside plates and keel bent, and work on the *Nachi* has been temporarily suspended. It is likely that a new keel will have to be laid.

Destroyer "Tsuta" has trouble with engines

The destroyer *Tsuta*, attached to the fifteenth destroyer division, which had been ordered to proceed to China, was docked for repairs prior to her departure. While in dock part of her turbines were replaced and on December 4, while undergoing trials, trouble developed with her engines and she was again taken into dock for further repairs.

Five old destroyers to be sold

The decommissioned third-class destroyers *Uzuki*, *Hayate*, *Yayoi*, *Hatsuharu*, and *Asashio*, now at Kure Naval Station, will be sold some time before May, 1926.

JAPAN

MISCELLANEOUS NOTES

January, 1926

[From the press]

Budget for the fiscal year 1926–27

The premier on December 21, presented the Government's budget for the fiscal year 1926–27 to members of the House of Peers at his official residence.

In presenting the budget the premier declared that the retrenchment policy adopted in preparation of the 1925–26 budget was strictly observed in the formation of the 1926–27 budget. "Consequently, no new demands, except extraordinary ones, pressing in nature, were recognized," he said.

Some of the details of the navy budget are as follows:

	Increase over budget of 1925–26
Ordinary account, ¥126,672,005	¥4, 322, 855
Extraordinary account, ¥112,356,000	7, 339, 066

New items requested for

	Ordinary account	Extra ordinary account	Total
	Yen	*Yen*	*Yen*
Maintenance of new ships	3, 479, 621	----------	3, 479, 621
Maintenance of new aviation company	600, 000	----------	600, 000
Extension and improvement of land wireless stations	184, 535	200, 000	384, 535
Additional appropriation for construction of noncapital ships	----------	8, 000, 000	8, 000, 000
Additional appropriation for equipment expenditure of aviation corps (construction of new buildings, ordnance expenses, etc.)	----------	600, 000	600, 000
Equipment for repair ship	----------	400, 000	400, 000
Protective grant money for those meeting accident through submarine disaster	----------	119, 000	119, 000

Airplanes at Kasumigaura

On September 30, 1925, the number of airplanes assigned to Kasumigaura naval air station was as follows:

Training planes	86
Service planes	67
(Also used for training.)	

NOTE.—It is believed that approximately 38 of the above training planes and 21 of the service planes are in storage in reserve at Yokosuka Navy Yard.

Separate air ministry demanded by General Nagaoka

A demand for a separate ministry of military aviation was made on January 22, on the floor of the Diet by Lieutenant General Nagaoka, retired, in an interpellation of the Government's program laid before the House.

General Nagaoka, who is a member of the Shinsei Club, one of the opposition parties, declared that the program does not afford sufficient subsidies to encourage civilian aviation, while military flying suffers from its present division between the army and navy.

In reply, General Ugaki, Minister of War, declared the time is not yet ripe for a separate air ministry, and will not be until airplanes become a more powerful fighting arm, and consequently the Government refuses to embody a separate air department in its program.

Japanese mission in Italy

A Japanese mission consisting of Capt. Mayda Nagumo, Noda Kawahara, and Rawa, of the Japanese Navy, has been in Italy in the last days of November. This mission visited the lighter-than-air constructing establishment at Rome, where a semirigid dirigible, N–2 type, is at present in course of construction for the Japanese Navy, and then proceeded, December 2, to Livorno for visiting the Italian naval and aeronautical academies.

It is understood that this mission will proceed to Switzerland, Germany, and England and will return home via the United States.

1925 census

[From a consular report]

According to the second official census, taken on October 1, 1925, the total population of Japan proper was 59,736,704, compared with 55,962,053 at the time of the first census in 1920, a gain of 7 per cent in five years.

The rate of increase in the population as revealed in this census is one of the highest among countries in which immigration does not constitute a factor. The density of population is only exceeded by that of a few of the highly industrialized countries of Europe.

If the area unfit for cultivation, which forms a large proportion of the total territory of Japan, be excluded, it is probable that the density of population would be found greater than that of the effective area of any country in the world.

This is the essence of Japan's population problem which is exercising the minds of the leaders of the nation. Birth control is repugnant to Japanese ideals as a possible solution, and consequently the alternatives open are emigration and industrialization.

As regards emigration, the following considerations present themselves: Japanese are excluded from the United States, Canada, and Australia, the countries which are regarded as the most promising fields for outlets. South America is too remote to permit of frequent visits to Japan, and the great majority of the people are averse to severing home ties permanently, while in oriental countries the standard of living of the indigenous population is too low to permit of Japanese competing with them. Furthermore, it is believed that even under most favorable conditions for emigration no practicable means could be devised for taking care of surplus population, which is increasing at the rate of 750,000 persons a year.

As regards industrialization, it may be said that while Japan is lacking in material resources this is compensated for by a stable political condition which would enable it, other factors being equal, to utilize the raw materials from other neighboring countries which are themselves hampered in developing industries because of unstable political conditions. Japan has the advantage of geographical propinquity to Asiatic markets, which is of the greatest value. As regards the chief factors of production, Japan has an abundance of labor, which, however, could be conserved to better advantage by efficient management, by better educational facilities, and by measures for ensuing a cheap supply of food. To offset the lack of raw materials, Japan has an abundance of hydroelectric power, the greater portion of which is undeveloped. At present one of the most important needs in the industrialization of the country is the elimination of the speculative tendency in business, as sound finance, together with the accumulation of capital by thrift, are essentials to the lowering of the rate of interest, upon which cheap production is dependent.

LATVIA

NEW SUBMARINES

January, 1926

Two of the submarines ordered in France are almost ready and will be put into commission in 1926. Orders have been given for two other small vessels, and the coast guard will then consist of five vessels.

MEXICO

RÉSUMÉ OF PRESENT CONDITIONS

January 30, 1926

[Source O. N. I.]

FOREIGN RELATIONS

United States.—The relations between the United States and Mexico have been complicated, due to the proposed petroleum and land legislation, which was promulgated on December 31 and January 21, respectively. See remarks under the heading of legislation.

Great Britain.—Esmond Ovey, the newly appointed British minister to Mexico, recently presented his credentials to President Calles. The diplomatic relations which had been suspended since June, 1924, were renewed the latter part of August, 1925.

China.—Continued hostility against the Chinese nationals appears to exist, especially in the States of Coahuila and Sonora.

Portugal.—Early in the month the diplomatic relations between Mexico and Portugal appeared to be rather strained, due to the refusal of Portugal to accept the charge d'Affairés accredited by Mexico to Lisbon.

LEGISLATION

In 1923 the late President Harding sent a commission consisting of John P. Payne and Charles B. Warren to Mexico City to negotiate a settlement of the differences existing between the two countries. Gonzalez Roa and Ramon Roos were the representatives appointed by President Obregon, the President of Mexico. One of the main points agreed upon by the commission was that there should be no enforcement of the provisions in the constitution promulgated in 1917, which permitted of retroactive features. On the strength of this agreement recognition was extended by the United States to the Mexican Government.

This same issue has come to the front by laws recently promulgated in Mexico, such as the antialien land law and so-called petroleum law, which appears from cursory reading of excerpts appearing in newspapers to contain elements of confiscatory and retroactive features besides violating the tenets of international law.

The principal features of the two bills promulgated are as follows:

No alien shall acquire direct ownership in lands and waters in a strip of 100 kilometers along the frontier and 50 on the coast nor be a shareholder in Mexican companies which may acquire such ownership in the same strip.

Foreign persons or corporations holding 50 per cent or more of the total interest in companies holding rural property for agricultural purposes shall retain it until death in the case of physical persons or for 10 years in case of corporations.

Every foreigner holding any interest in a company having such object must file a declaration disclosing such interest within one year, otherwise "the acquisition will have been considered as having been made subsequent to the effective date of this law," i. e., all his rights become forfeited if handled otherwise than in accordance with the provisions of the legislation mentioned.

Article 12 of the petroleum law reads as follows:

Concessions granted by the Executive of the nation in accordance with previous laws will be confirmed without any cost whatever, subject to the provisions of this law.

This, it has been pointed out, is one of the jokers of the bill in that it merely transfers former holdings to leases not to exceed 30 years with careful stipulations against foreigners.

This legislation has created considerable apprehension among foreign interests and, according to the El Universal Grafico, there have been two meetings of the diplomatic corps, except the Spanish minister, in Mexico City to determine the form of joint protest, if any, which shall be taken against the new oil and land laws.

Already 27 injunction suits have been filed by foreign companies with the Mexican Supreme Court seeking to restrain the Government from putting into effect the retroactive clause of the new petroleum law. The district courts have declined to handle these cases.

In a late newspaper report a statement appears that agreement has been effected by the Mexican Government and a recently appointed committee of five leading oil men, representing a majority of the oil interests, not to give out information to the press. The committee hopes to obtain a satisfactory regulatory decree pertaining to the new oil law which President Calles has yet to publish.

The value of American and foreign interests in Mexican land and property is estimated at $2,000,000,000. American holdings covering oil, gas, mines, and agricultural land is estimated to amount to from $1,300,000,000 to $1,500,000,000.

According to statistics compiled by the Mexican Government, they indicate almost complete foreign possession of the major resources of exports. The proportion of oil resources owned by nationals is as follows:

Country	Per cent
United States	57.46
Great Britain	26.16
Netherlands	11.37
All other countries	1.09
Total for all foreign countries	96.08

No exact statistics are available as to ownership of mineral industries, but no doubt about the same percentage is controlled by foreigners as in the case of oil resources.

TRADE AND COMMERCE

About 80 per cent of Mexico's exports and imports are handled by the United States. The general economic conditions in that country for the past two or three months have been rather bad. The production of petroleum during the past year has been materially

reduced, and, due to the agrarian troubles, an increasing amount of agricultural products are being shipped into that country from the United States to the concern of the Mexican Government.

LABOR CONDITIONS

It is estimated that about 1,000,000 Mexicans are members of various labor organizations existing in Mexico. Reports indicate a great deal of unemployment due to present climatic, financial, and other conditions, and grave concern is felt by the conservative element for the amelioration of labor.

The chamber of deputies recently passed a bill authorizing the president to complete and promulgate a general labor law regulating article 123 of the constitution.

FINANCE

On September 1 the Bank of Mexico was established in accordance with the organic law passed August 25, 1925, with an authorized capital of 100,000,000 gold pesos. This bank corresponds in many respects to the Federal banking system of the United States and our Treasury. The bank began operations with a fund of 64,000,000 gold pesos, of which 60,000,000 pesos were subscribed by the Government.

It appears from newspaper articles that the Mexican Government during the past year has been able to conform to the budget requirements and in addition to affecting economies has been able to liquidate various private claims and salaries to government employees in arrears.

FOREIGN DEBT AGREEMENT

Early in the month the Pani-Lamont (the latter representing an international group of bankers) agreement for the refunding of Mexico's foreign debt was approved by the Mexican Government. The debt consists of about $517,000,000 principal amount of the bonds, about $200,000,000 arrears in interest dating from before the 1922 agreement, and about $40,000,000 in default under that document's provisions.

A statement appears in a late issue of a New York paper that the Mexican Government has forwarded $416,000 to the J. P. Morgan firm, of New York City. This is the initial payment under the Pani-Lamont agreement recently concluded.

RAILROADS

The National Railways of Mexico, which have been administered by the Mexican Government since 1914, were returned to private

ownership and control on January 1, 1926. The Government anticipates the railroads will be able to liquidate their share of the foreign debt to the amount of $230,000,000.

REVOLUTIONARY ACTIVITIES

Early in January, due to the prompt action of the military authorities, two plots were uncovered in the States of Jalisco and Aguascalientes tending to interfere with the domestic tranquillity of those States.

The conspirators were arrested, summarily tried by court-martial, and sentenced to death. Five of the eight conspirators were executed in a suburb outside of Guadalajara. One of the revolutionists when confronted with incriminating evidence confessed that he was working under the orders of De la Huerta and Enrique Estrada. He also stated ex-Gen. Guadalupe Sanchez was likewise implicated.

Col. Jose Marquez, the leader of the attack at Aguascalientes, confessed to having received orders from De la Huerta and Enrique Estrada.

On the evening of January 9 the direct train from Guadalajara to Mexico City was robbed and totally destroyed by fire at a point about 75 miles east of Guardalajara. There were heavy casualties among the train guard. The attacking band was under the command of an ex-Federal army colonel. According to late press dispatches, the members of this band have been either killed or captured and loot recovered.

It is possible some political significance may be attributed to this attack in view of the fact that General Ferreira assumed command of the Guadalajara district on January 1, and reports had been circulated in the Mexico City papers that he (the general) contemplated making a trip shortly to the capital, and of the thorough search made of the Pullman car for possible secreted passengers.

RUMANIA

NAVAL ESTABLISHMENT

January, 1926

[Source M. I. D.]

The Rumanian Navy consists of the Black Sea division and the Danube division. Personnel: Officers, 157; men, 4,100.

The Black Sea division consists of:

Two torpedo-boat destroyers, each 1,460 tons; speed, 35 knots; armament, three 6-inch, four 14-pounders, four torpedo tubes.

Four gunboats (late French), each 355 tons; speed, 15 knots; armament, two 3.9-inch guns, two machine guns.

Six police craft; armament, two 11-pounders, two tubes.

The Danube division consists of:

Seven river monitors; four of these are of 670 tons; speed, 13 knots; armament, three 4.7-inch guns, four 3-pounder guns, three A. A. guns. Three of 550 tons; speed, 12 knots; armament, two 4.7-inch guns, three 4.7-inch howitzers; two 11-pounder A. A. guns.

Seven vedettes of 50 tons; speed, 18 knots; armament, one 3-pounder, two tubes, one 6.5-mm. machine gun, one searchlight.

There are naval bases at Constantza and Braila, and the Black Sea divisional dock at Sulina, the naval dock at Galatz, the Danube division depot at Galatz, and the naval arsenal at Galatz.

The general standards of efficiency are low. Rumanians are not a seafaring people and make poor sailors.

RUSSIA

MOVEMENTS OF SOVIET FLEET

[From the German press]

The maneuvers of the Baltic fleet were brought to a close in September. Soff, the commander in chief, made the following statement to representatives of the press:

> The recent tension with England gave a new tone to the Baltic maneuvers, for we are convinced that Petersburg will be the first goal of the British in the event of war. Nevertheless, the maneuvers showed that the Russian fleet is thoroughly prepared to defend Petersburg from any attack. It will be necessary to replace the old-line ships with more modern types. This is a very difficult task at present owing to the condition of the Russian dockyards.

Submarines and seaplanes also participated in the maneuvers.

After a short intermission, the Baltic fleet began autumn maneuvers, which will be continued until the ice flow begins. The line ship *Marat* and four destroyers also took part in these maneuvers. Some of the maneuvers took place so close to Reval that a Russian submarine got into Esthonian waters and was made the subject of a complaint on the part of the Esthonian Government.

SPAIN

NEW TORPEDO FACTORY

A royal decree of November 26, 1925, authorizes the subsecretary in charge of the Ministry of Marine to concert an agreement with Mr. Horacio Echevarrieta (the well-known miner and business man) for the manufacture of torpedoes in Spain. It seems that, in view of the failure met by the Fabrica Nacional de Torpedos at Cartegena, as set forth on page 38 December, 1925, BULLETIN, the Government resorts to private initiative.

The main points of the conditions fixed by the Government are as follows:

a. The contract will be for 12 years, at the end of which time the factory and installations will be taken over by the navy.

b. The new factory will be able to turn out a normal production of 100 torpedoes per annum, with capacity to triplicate this production in special circumstances.

c. No fixed type of torpedoes is prescribed. The type or types will be those thought convenient at the time by the Minister of Marine. Torpedoes are to be tested before delivery to the Government.

d. The factory will be erected at Mar Menor (some 20 kilometers northeast of Cartegena). This place, by its proximity to the Mediterranean and to the target fields, is considered very convenient. The factory will be almost secure from attack from the sea, and in the vicinity there exists a base for military hydroplanes which might protect it from air attack.

e. The factory and installations are to be ready in 18 months, counting from the date of the contract.

f. The machinery existent at the Fabrica Nacional de Torpedos, Cartegena, will be used by Mr. Echevarrieta, but necessary machinery to manufacture up-to-date torpedoes will be added. Part of the personnel serving at the Fabrica Nacional de Torpedos will be assigned for duty with the new factory.

g. The Ministry of Marine will exercise general control over the factory and the production of torpedoes.

SWEDEN

ACTIVITIES OF BOFORS COMPANY

[Source reliable]

According to the Stockholms Dagblad (conservative) of November 6, 1925, a person connected with the Bofors factory has stated

that the works have sufficient orders on hand for war material alone to keep their large force of workmen fully occupied for the next two years at least. Continuing, the article states that it is no military secret to Holland that the largest deliveries of war material are being made at present by this well-known factory. The pertinent part of the article runs as follows:

Several years ago Holland ordered a very large number of 75-millimeter mountain guns intended for the defense of its East-Indian Colonies and now, that the delivery has been effected, further orders have followed. Thus Bofors has been intrusted with the manufacture of approximately 30,000 rounds of ammunition for this mountain artillery, in addition to the manufacture of specially designed transportation equipment for these guns, which can not be transported in the same manner as field guns but must be carried on the backs of horses or mules.

In addition to these deliveries of mountain artillery, Holland has also commissioned Bofors to manufacture a number of naval guns and guns for permanent emplacement of various calibers, including six 15-centimeter rifles, eight 12-centimeter rifles, and six 75-millimeter antiaircraft guns for the fleet. Furthermore, one 105-millimeter field howitzer has been ordered as an experimental piece. While the manufacture of this war material has been going on the Dutch Government has had stationed at Bofors a military representative—one of Holland's foremost technical artillery experts—who has subjected every little detail to the most minute inspection. The best evidence that the completed material has satisfactorily passed inspection is that the Dutch Government has placed further orders with the Bofors Co.

Needless to say, the construction of this artillery requires the very latest technical improvements which, as a matter of fact, excel anything previously developed in this field, being the result of mechanical precision and of the highest mathematical skill. Such a detail as the mere sighting apparatus has now become a special science. The time wasted in adjustment fire with its overs and shorts has been completely eliminated by the use of the instruments with which the pieces are equipped so as to show to the millimeter the exact distance to the target. More than one foreign expert has described them as a technical masterpiece.

The article concludes by stating that the Bofors works are also engaged in executing orders for many other countries, including Sweden. The latter has ordered from Bofors the naval guns for the new destroyers authorized by the Riksdag, as well as a number of 12-centimeter guns and a few antiaircraft guns for defense purposes.

Three days after the publication of this article the board of directors of the Bofors Co. issued the following statement to the press:

With reference to the recently published press article respecting the delivery of munitions to foreign countries by the Bofors Co., the management of Bofors takes occasion to announce that the article in question was given out without the knowledge or consent of the board of directors or of the management, and that, in its essential details, it is misleading and especially designed to give an erroneous impression of the volume of the plant's present unfilled orders.

This unconvincing denial, which would appear to be circumstantial evidence of the substantial accuracy of the newspaper article, was commented on as follows by the Stockholms Dagblad in its issue of November 9:

Inasmuch as the board of the Bofors Co. declares that "the article in its essential details is misleading and especially designed to give an erroneous impression, etc.," it may possibly not be asking too much of those in authority to do us the favor of informing us in just what respect our statements were incorrect. Moreover, we are in a position to state that our informant, who is

fully conversant with the facts, is not only prepared to substantiate the correctness of the substance of our article, but, if necessary, is further prepared to furnish a more precise and more detailed description. Finally, curiosity regarding the Bofors Co. has not lead us to seek an interview for the purpose of making any corrections in the matter.

SWEDEN

RECENT TEST IN GAS PROTECTION

[From the Swedish press]

On November 18 the maneuvers for the protection against toxic gases began at Haegerstalund. The maneuvers will last until the 21st of November and are the last examination of the students who have completed a course in gas protection. At the suggestion of the chief of the general staff the war board voted the necessary supplies. The course of training, which began on November 2, is the first of its kind in Sweden, and the methods employed as well as the results attained until now prove clearly enough that, as far as conditions allow us to do so, we endeavor to adapt ourselves to the development of the modern art of war.

Officers from all regiments of the army, 3 naval officers, and 3 officers of the coast artillery, about 75 officers in all, had been ordered to go through this course, which was held in the Life Guards under the command of Major Afedholm. Right from the beginning this group of officers was divided into two classes, each class to have a three weeks' course, so that already on next Tuesday, after the first practical examinations are over, the next course will start and last until about Christmas. During the course of the maneuvers the participators had been allowed to dispose of one company and one machine-gun squad, both of them consisting of troops of the infantry regiments 1 and 2, as well as one battery of the artillery, regiment I, and it was these troops, with the exception of the battery which was not to be employed before Thursday, that on Wednesday morning introduced their grotesque gas masks and under the command of the special officers made an assault through the black-gray clouds of tear gas around Igelbaecken.

On the whole, the three days' maneuvers are supposed to let the infantry approach, protected by a smoke screen, to let the infantry fight under different circumstances while being covered with gas by the artillery. And even on Wednesday, which was the first day of the maneuvers, approaches were made under the protection of smoke screens.

At 9 o'clock in the morning the troops started marching and the first fight was the defense of a fortified position which was covered

with gas by the enemy. In the territory between Haegerstalund and Saebysjoe the fight was most violent early in the morning—fictitious artillery of the enemy swept the positions all the time, and the tear gas did its best to render it difficult to hold the positions. Notwithstanding, firing was very lively, the gas masks worked excellently, and the enemy attack could be repulsed after some hours.

The other fight of the same day was accomplished as an open-field battle, the company attacking a position marked with cardboard figures. The approach began on the airdrome north of Jaerfaella and was directed to a territory northwest of Haegerstalund, where the enemy had prepared for defense. By means of smoke screens the troops protected themselves from being seen from the ground, and amid the forest, which had been covered with gas, the gas masks had to be employed and all movements had to be done with the slowness which is one of the disagreeable results of the ground being covered with gas. The tear gas is a rather harmless gas which, by compelling the troops to use their gas masks, will render the movements of the troops more difficult—they will grow exhausted and breathing becomes difficult. The gas masks made it easier to advance through the smoke-filled air. The accuracy of aim was good in comparison with the circumstances, and the maneuvers ended at 1 o'clock. To-day's maneuvers were attended by the chief of the general staff, Major General Hammarskjoeld, with his staff.

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OFFICE OF NAVAL INTELLIGENCE
NAVY DEPARTMENT
Washington, D. C.

MONTHLY INFORMATION BULLETIN

SUPPLEMENT NUMBER 4

FEBRUARY, 1926

DISTRIBUTION

In general: Bureaus of the Navy Department; all force commanders; all commanding officers of capital ships, the larger patrols, destroyers, and submarines.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1926

This is the fourth of a series of SUPPLEMENTS to the MONTHLY INFORMATION BULLETIN which it is proposed to issue from time to time as suitable articles come to hand. By this means it is hoped that the Office of Naval Intelligence may supply the medium for circulating to the forces afloat those articles upon service topics which, while valuable and interesting, are also confidential or otherwise restricted, and therefore unsuited for publication in the regular service journals or in the Naval Institute, and which because of their length can not be included in the regular issues of the BULLETIN.

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OFFICE OF NAVAL INTELLIGENCE

MONTHLY INFORMATION BULLETIN

SUPPLEMENT NO. 4—FEBRUARY, 1926

FOR CONVENIENCE IN ROUTING

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THIRD DIVISION OFFICER			
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FIFTH DIVISION OFFICER			
MARINE OFFICER			

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NOTICE.—Owing to the expense involved only a limited number of copies of this SUPPLEMENT have been printed. After the usual circulation has been effected it is requested that it *not be destroyed,* but either be kept on file or returned to the Office of Naval Intelligence.

This SUPPLEMENT is marked "For official use only" and may be mailed unregistered.

PREFACE BY THE OFFICE OF NAVAL INTELLIGENCE

This SUPPLEMENT is a translation of parts of "The War at Sea, 1914–1918, North Sea, Volume V," from the German of Commander O. Groos, I. G. Navy. This book is the German official naval history of the war and is issued by the Naval Archives Office.

The following parts relating to the Battle off the Skagerrak have been translated:

Chapters 7 to 14, inclusive.
Appendixes 5, 7, 9, 11, 12, 14, 17.

The German text is accompanied by an elaborate series of large charts of the battle, but as these are printed in three colors the cost of reproducing them is prohibitive.

The translation has been made by Commander W. P. Beehler, United States Navy (retired). The translation has been examined and revised by Lieut. Commander H. H. Frost, who has prepared a series of explanatory notes which are inserted in the text in *brackets*. A series of his sketches, previously issued by the Office of Naval Intelligence and for which the plates were still available, has been inserted at the rear of this book to facilitate the reader in following the course of the battle. While the official German charts show these sketches to be in error in certain details, they still show correctly the general course of the battle, and such errors in detail as they contain are corrected in the notes.

Particular attention is invited to Appendix 7, which gives the organization of the High Seas Fleet on May 31, 1916. This should be examined before reading the text and frequently consulted thereafter. Attention is also invited to Appendix 17, which shows the German radio messages and visual signals sent during and after the battle.

It is recommended that the text, the signals, and the sketches be covered at the same time; when studied in conjunction they will give the clearest conception of the battle.

This account is considered to be by far the best and most interesting account of the Battle off the Skagerrak thus far published. Its descriptions are particularly accurate and detailed and the reasons for the various decisions on the German side are presented in full, including even the estimates of the situation made by captains of individual destroyers and submarines.

NAVY DEPARTMENT,
Washington, February 1, 1926.

N. B.—The notes in brackets [ ] are by Lieut. Commander H. H. Frost. U. S. N.

"DER KRIEG ZUR SEE," 1914–1918—NORDSEE, VOLUME V

By Commander O. Groos, I. G. Navy

FOREWORD BY THE AUTHOR

The present Volume V of the "Krieg zur See" (North Sea) comprises the period between January and June, 1916. In this particular period the naval warfare in the North Sea went through a fundamental change. After a year of strictly defensive warfare the High Seas Fleet was exerting every effort to gain a decision. On the German side new men had taken over the command of the fleet, and thus from the beginning of the year 1916 all operations of the German High Seas Fleet were founded on the primary mission of seeking battle. A survey of the general situation on land indicated the desirability of a sharper offensive at sea. Thus it was not difficult to obtain the approval of the Kaiser for more extensive operations planned by the German commander. An advance of the entire High Seas Fleet into the Hoofden [" Hoofden " is the German name for the southern part of the North Sea between the Harwich coast and the Netherlands. See fig. 2] early in March was followed in April, 1916, by the bombardment of the coast of England near Lowestoft. [See fig. 1.] Since the submarines had to be withdrawn from the commerce warfare which had just been begun on account of the decision of the political leaders, they were employed in operations with the fleet and in the operations which were conducted during and up to the end of May were utilized for strictly military service.

This sudden increase in the activities of the German fleet very soon brought about a counteroffensive from the English. At first, however, this did not extend beyond several air attacks on the German airship hangars supported by surface craft. Only after the bombardment of Lowestoft did the British strategy lead to a sharper offensive with the purpose of bringing on a fleet action. This was further influenced by the fact that the Russian ally was suffering from the effects of the blockade as much as the Germans, and for that reason desired a more active employment of the British Fleet to gain a decision. Thus the English had planned a large-scale fleet operation for the end of May quite similar to the Germans, and the strategic situation in the North Sea thus culminated of itself in a clash which has been designated as the Battle off the Skagerrak (Jutland).

On the naval Battle off the Skagerrak, in which more ships were engaged than at any other time in the history of the world, much has already been written. The two fleet commanders, Admiral Scheer, in "Deutschlands Hochseeflotte im Weltkriege" and Admiral Jellicoe in the "Grand Fleet, 1914–1916," have already given detailed accounts. Personal experiences in the battle have been given by von Hase in "Die Zwei weissen Volker" and by Lieut. Commanders H. W. Fawcett and G. W. W. Hooper in the volume entitled "The Fighting at Jutland." Then in England the work of Sir Julian Corbett, "Naval Operations, Volume III," was followed by the "semi-official" "Narrative of the Battle of Jutland"; the official account of the battle was published by the Admiralty itself. Both of these publications had the drawback that, aside from the already published reports of Admiral Scheer, the authors had no German material available.

On the other hand, in the preparation of the German account the complete official reports practically without exception were ready at hand. As early as December, 1920, public opinion in England forced the Admiralty to lay before the Parliament the so-called Blue Book, containing nearly all of the war diaries, battle reports, and charts of the British vessels engaged in the battle with apparently few exceptions. Although for the layman this great mass of detail is hardly comprehensible, for the naval expert they offer a mine of authentic data on which to judge the developments on the British side, and all the more important since they were not written for publication. And since the compiler of this volume had also available the German official data which was no less comprehensive and detailed, it was possible for the first time to compile an account which was based on the official data of both sides. This differentiates the following from any accounts which have been published by either side to date.

In giving an account of a naval battle the author must proceed along different lines from the method of describing a battle on land. In naval warfare the military strength is concentrated in such a few units, while the effects of individual shells, torpedoes, and mines are of such great importance that they must be described in all detail where possible. Further, the developments of the battle, due to the high speed of the ships and the limited space and concentration of fire, take place with such rapidity that minutes and seconds involved in the evolutions and decisions of the leaders correspond to days and hours in the land engagements. In the rush of events and the mass of detail the human memory would fail were it not for the fact that, on the battleships at least, everything pertaining to the navigation of the ship, the employment of the armament and propelling machinery, was written down on the spot, even during the height of the battle,

and the loss in battle of any one station automatically necessitated taking up the record by another. Thus, on the German as well as the English side, there is available a wealth of material comprising observations, records of times, sketches, and navigational fixes, on the part of the vessels engaged, which seems unbelievable to the layman. Thus, in general, it is not the lack of material but rather the superabundance which makes for the difficulty of compiling an authentic account. No individual observer is capable of recording from one station more than a small part of the developments which are taking place, and as the action progresses these individual observations are found to contain more and more errors and contradictions. This is particularly true of the courses plotted and the battle sketches of the individual ships. These often show considerable errors in the navigational fixes, and in particular errors in latitude and longitude, which can only be reconciled by numerous comparisons and checking back. In the case of the light cruisers, destroyers, submarines, and airships, even these reports are sometimes lacking entirely, so that in some phases of the battle it is impossible to state with any degree of accuracy the exact location of some of these light forces. In spite of this the chart representations of the battle are so near the truth that they can be accepted as historically accurate as a whole.

The gunnery reports are sufficiently complete to permit about 65 per cent of all the major caliber hits to be exactly determined on both sides and recorded on the charts and in the text with the time.

On the other hand, there were, further, about 10,000 German and English radio messages and 300 detailed battle reports and war diaries to study and fit in as a mosaic into the general account as a whole. Although in the text and on the charts no approach can be made to the breathless developments of the battle as they actually occurred, yet the complete account furnishes a comprehensive view of the whole situation which could not be obtained by any observer of the battle, even the force commanders themselves. In such a reconstruction of the events of the battle there is the danger that the commanders of the forces might be assumed to have a much more complete knowledge of the situation than could have been the case in reality and on which they had to base their decisions. In this mistake Admiral Jellicoe saw the greatest fault of the British accounts. Even the work of Sir Julian Corbett is faulty in this respect, as he is too prone to attribute motives in particular to the German commander in chief based on information after the event. This would probably not have occurred had the author been an eyewitness of the battle. On the other hand, it must be stated, in order that the reader might correctly judge the account, that the compiler of this volume was present during the battle as navigator of the *Von der Tann*.

In regard to the actual developments of the battle there is hardly room for difference of opinion among the naval experts after the wealth of material presented. But even to-day in England there is considerable strife in regard to the decisions of the commanders in the battle, which has not been silenced by the publication of the official and "semiofficial" accounts. Thus, a statement of the Admiralty has been singled out of the work of Sir Julian Corbett which is in direct contradiction to the opinion of the Lords of the Admiralty, particularly the tendency to minimize the principle of seeking battle and fighting it through to a decision. But even the official account of the Admiralty has not received general acceptance, and, as is shown by extracts in the appendix, is in error in some particulars, as pointed out by Admiral Jellicoe. On the other hand, it must be pointed out that the present volume has been submitted to the various German commanders who participated in the battle, and in particular Admiral Scheer and Admiral Hipper have expressed their thorough approval of the statements contained therein. As a result this work proves that the German claim to a victory at Jutland withstands the most searching historical investigation. It must be a source of profound satisfaction to the German nation to know that in this mighty test the morale, character, and intelligence, as well as the technical accomplishment, in this battle were so gloriously proven. The example which these men set on the German ships at Skaggerrak in fighting, suffering, and dying is a holy legacy bequeathed the nation. In the words of Friedrich the Great. "It is not necessary that I live, but rather that I do my duty, that I fight to save my country."

March, 1925.

THE WAR AT SEA—NORTH SEA, VOLUME V

Chapter 7

DEVELOPMENT OF THE STRATEGIC SITUATION UP TO THE BATTLE OFF THE SKAGERRAK

On May 8, 1916, the auxiliary mine-sweeping flotilla of the North Sea, under Lieut. Commander Walter Krah, had succeeded in locating the approximate position of the English mine field which the *Seydlitz* had struck in standing out to participate in the operations against Lowestoft. This barrier lay to the northward of Borkum Reef Shoals, contained two different types of mines, and extended for about 15 miles in a northeasterly direction. At about the same time Mine-Sweeping Division III, Commander Eberhard Wolfram, discovered another mine field which was laid by an enemy submarine near the mouth of the Elbe, which, owing to its position on the course from the Elbe to the Jade, might have proved exceedingly dangerous had it not been discovered in time. The commander in chief decided to have the *Seydlitz* mine field swept as soon as possible in order to secure a mine-free course from the middle of the German Bight, which was essential if the fleet were to put to sea unobserved. [That is, from the Dutch coast.]

The rapid completion of this work was all the more essential, as beginning May 17 the entire High Seas Fleet would be ready in all respects for battle. A large number of submarines being available for joint operations with the fleet, this period of relatively great strength was to be utilized to the utmost for new offensive operations.

On April 24, while Admiral Scheer was returning with the High Seas Fleet from the operations against Lowestoft, he received a telegram from the naval staff while still at sea, stating that in spite of the policy for the resumption of submarine warfare which had been decided on at the beginning of the month, until further orders such commerce raids were to be conducted only in accordance with the "Rules for prizes." The occasion for this order was brought about by a note from the United States of America as a result of the sinking of the French liner *Sussex* in the English Channel. The commanding officer of the submarine had mistaken this vessel for

a mine layer, therefore a man-of-war, on account of the peculiar-shaped superstructure and gray painting, and had therefore attacked it with torpedoes forthwith. These new instructions ordered that in every case before sinking an enemy ship or neutral carrying contraband the submarine must come to the surface. This maneuver, according to the views of the commander in chief, was in contravention to the peculiar nature of the weapon and rendered the submarine helpless against treacherous attack, so that great losses must certainly be incurred without corresponding chances of success. This point of view was adequately confirmed by the latest operations against the west coast in which the leader of submarines, Commander Hermann Bauer, had personally participated on the *U–69*.

With the increasing practice of arming enemy and neutral steamers and the customary misuse of neutral flags and markings, Admiral Scheer was not able to assume the responsibility for conducting submarine warfare in accordance with the "Rules for prizes."

On the same date on which the telegram from the naval staff was received he therefore recalled by radio all the submarines on the west coast and notified the chief of the naval staff by telegram that, much as he regretted the necessity for the action, the submarine commerce war must cease, although he was convinced that such effective warfare against British commerce would be a decisive factor on the outcome of the war.

Already, on May 4, the commander in chief had proposed to the naval staff a new method of procedure which would permit at least the partial employment of submarines and not keep them wholly in idleness while at the same time avoiding further political conflict with neutral powers until the situation was cleared up. He was forced, however, to withdraw these proposals on the same day when the answer of the German Government to the United States became known. In this note it was stated, without previous consultation with the naval authorities, that the German ships had received instructions, in accordance with the accepted rules of international law regarding the search and seizure of merchantmen, not to sink any merchantman even in the restricted areas without warning and saving the personnel, even though the vessel attempted to escape or to offer resistance. The demands of the political leaders that new conflicts with neutral powers be avoided under all circumstances could therefore not be made to agree with the military necessity, so that the submarine commerce war which had hardly begun had to be sacrificed again to the opposition of the politicians.

Under these circumstances the efforts of the commander in chief to employ the High Seas Fleet in more offensive operations became of greater moment, and thus the fact that a large number of submarines

had become available for strictly military service against enemy men-of-war and bases brought with it a certain advantage. Estimates as to the manner in which these submarines could be most usefully employed in joint tactical operations with the fleet led to the plan for May 15. In addition to the previously described operations of submarines on the blockade lines Fair Island—Marsten and Peterhead—Egero, it was planned to send as many as possible of the torpedo submarines to the east coast of England to occupy stations near the most important man-of-war harbors, then by means of a sortie of the fleet to draw the enemy ships out of the harbors and toward the waiting submarines.

On the English side the motives which were to lead to greater offensive measures were also increasing. The fact that the enemy after a long period of inactivity had been able to make another raid on the English coast and escape unpunished had stirred public opinion to the utmost. Even though this excitement had not yet reached the stage of panic, the Admiralty deemed it necessary to take measures to strengthen the public confidence in the fleet. (Corbett: Naval Operations, vol. 3, p. 313.) Mr. Balfour, the First Lord of the Admiralty after the resignation of Churchill, therefore wrote to the mayors of Lowestoft and Yarmouth, stating that the fleet would be reorganized in their bases in such a manner that a repetition on such raids as occurred on April 24 could not take place without grave danger to the attacking forces. Up to then it had been considered necessary to hold the major portion of the fleet in the north. In this manner any extensive operation of the enemy such as an "invasion" could be readily combated, but a "raid" was not so easily coped with. Now, however, since a large number of newly constructed units were ready for active service, and in this manner the relative strengths of the two fleets considerably improved, not only were additional forces available for coast defense but in fact a portion of the Grand Fleet itself might be sent to the southern waters without endangering the fleet defenses at any other point. Such a regrouping of the fleet had been in fact considered since the beginning of 1916 but had had to be postponed on account of the old difficulty of establishing sufficient bases which were safe from submarine attack.

There were, however, other influences that were pressing the British fleet to greater offensive undertakings. Since New Year, 1915, the Russian Captain (later Finnish Commodore) von Schoultz had been liaison officer with the Grand Fleet. This officer regarded the "wait and see" policy as a very doubtful expedient.

Aside from the fact that he considered the British hunger blockade with the holding back of the fleet a violation of international law, he

believed the starvation of the enemy by this means to be faulty from a military standpoint.

According to his views this method of blockade, in so far as it affected neutrals, was further a distinct disadvantage to some of the Allies themselves. This applied principally to Russia, which country, as well as the Central Powers, was cut off from its communications with the industrial nations of the west. Before the extension of the blockade Russia had received a large amount of supplies through Scandinavia, such as farm and other machinery, locomotives, rails, cloths, etc. Now, with the extension of the blockade lines all these importations ceased and the only route left open for such supplies was over the northern polar sea, if one excepts the long and expensive haul over the already much overcrowded Siberian railway. Anyone who had followed the situation closely could observe, in accordance with the views of the Russian captain, that the blockade which was directed against the Central Powers was at the same time dragging down Russia, since this nation had been lacking in important industrial equipment from the beginning of the war.

Under these circumstances it was to be feared that the disorganization which had occurred in the Russian Army in Galicia due to lack of proper military equipment would be repeated in the next spring and summer in the north, where the German fleet covered the left wing of the army. Captain von Schoultz therefore held it to be his duty to stress the drawbacks of the blockade to the British Admiralty as well as to the Russian general staff, to recommend a consolidation of the allied naval front, and that the English fleet, or at least a portion of it, should extend their operations into the Baltic.

While the Russian captain was working out a memorandum to this effect he was in constant touch with the leading authorities of the Admiralty—the first sea lord, Admiral Jackson, and the chief of staff, Rear Admiral Oliver.

The latter pointed out the difficulties of carrying out military operations in the Baltic and quoted as an example the unfortunate attempt to force the Dardanelles; further, he showed that any attempt on the part of the British fleet to penetrate the Baltic would be countered by a German occupation of the Danish islands which would result in cutting off the fleet from its bases.

Even Captain Schoultz believed that extensive operations in the Baltic were out of the question until the German fleet could be decisively defeated in the North Sea. A victory in this area would, moreover, give the British fleet a free hand and also exert a marked influence on the further course of the war. A continuation of the war ad infinitum threatened to cause the industrially weak nations

to drop out of the allied ranks, thus weakening England's own position. According to his views, then, it was essential that the strategy at sea be diverted into more active channels; that the German fleet be brought to battle and the consolidation of the sea front effected; otherwise the consequences during the coming summer and winter might prove a very unsavory surprise to the allied forces.

By consolidation of the front at sea he meant a closer strategic, and in certain respects, tactical cooperation of the allied fleets, which should take the form of a large-scale demonstration in the North Sea, near the Skagerrak and the Kattegat, this undertaking to be aided by the detachment of light cruisers, destroyers, and submarines from the fleet for the further extension of these operations into the Baltic, which was finally to culminate in a well-planned offensive of the combined allied fleets in that area.

As early as the middle of December, 1915, he delivered a memorandum outlining the above plan to Mr. Balfour and the First Sea Lord of the Admiralty, Admiral Jackson, and early in 1916 certain English newspapers contained articles which indicated a coming change in the allied strategy at sea tending toward a more energetic offensive. Such an article by Mr. David Hannay in the Morning Post closed with the following words: "The Baltic is the only theater of war where the British fleet has not as yet fulfilled its mission of controlling the sea. Only the expressed inability of the fleet to accomplish this task could justify the failure to make an attempt in this direction."

This new expression of public opinion coincided with the views of the Russian liaison officer and was a source of great satisfaction to him.

On January 24 Captain Schoultz proceeded from London to St. Petersburg in order to further discuss the question of cooperation of the British and Russian fleets in accordance with the plan which he had suggested. Before his departure, however, he had had another interview with Balfour in which the latter expressed the opinion that the British Admiralty could not alter its naval strategy until the German fleet had been decisively defeated. When such a defeat could be expected was difficult to prophesy. The Grand Fleet was in constant readiness for battle but did not wish to be drawn into a previously prepared trap near the German coast.

On February 17 a special meeting of the war committee, in which Admiral Jellicoe participated, was called, partly on account of the memorandum of the Russian liaison officer and partly owing to the pressure of public opinion. At this meeting the general strategic situation was thoroughly discussed from this standpoint, and primarily the possibility of a large-scale offensive based on the tenta-

tive plans of Lord Fisher was considered. Although this plan had not been worked out in all its details, the basic idea was the shattering of the German plans by forcing the enemy to defend both the North Sea and Baltic coasts at the same given instant, thus compelling him to divide his fleet.

The means for accomplishing this purpose were either to attempt the occupation of one of the German islands in the North Sea as a base for aircraft and submarines or to blockade the German river mouths by means of mines and sunken ships. In the meantime, however, the difficulties in connection with the execution of such a plan had considerably increased. As a result of the increased range and effectiveness of the field artillery of the army such an island could not be held for any length of time if it were taken under fire from the mainland. Further, the necessary troops for the landing force were lacking. Also the increased effectiveness of the mines and submarines, aside from the resistance which could be expected from the German High Seas Fleet, would very considerably increase the difficulties of keeping open a line of retreat for a fleet attempting operations in the Baltic. For these and other reasons it was finally decided that a naval offensive of such scope as contemplated by Lord Fisher was no longer practicable. Further, grave objections were raised against the plan of blockading the German rivers with ships and mines. If this bottling were to be effective, a larger number of vessels would be required than were available for this purpose owing to the severe shortage of freight steamers. As a result of the transfer of a large number of workmen from the shipyards to the army the construction of merchant vessels could not keep pace with the losses by mines and submarines. (Corbett: Naval Operations, vol. 3, p. 314.)

Efforts had already been made to have this group of workmen withdrawn from the army, and, furthermore, the construction of merchantmen had been declared to be "war work": but even then there were grave fears that the overseas imports could not be maintained at the normal level. The use of mine barriers alone had the disadvantage that they required constant supervision of warcraft if they were to remain effective and to prevent sweeping of them. This, in turn, was only possible provided the German fleet had previously been defeated.

From the above consideration it was concluded that the existing policy of watchful waiting could not be abandoned: all that could be undertaken were further efforts to induce the German fleet to make a sortie from its bases and to lure them into a trap.

For this purpose the previous distribution of the fleet, in the opinion of the Admiralty, left much to be desired, and even before the bombardment of Lowestoft this problem had been the subject

of a new conference in Whitehall at the beginning of April. At this meeting the First Lord of the Admiralty expressed the opinion that aside from the fact that the existing distribution of forces did not afford the south coast any protection, the fleet was based too far to the northward to be effective in damaging or cutting off the retreat of an enemy force repeating the bombardment of Yarmouth, Scarborough, and Hartlepool, or such similar raids as were conducted in 1914. As long as this concentration of forces was maintained in the far north, the enemy would not commit suicide by venturing so far in their sorties that they could be brought to battle, and one could only expect further minor operations of German airships and light forces even though it was to be assumed that under Admiral Scheer the fleet operations would be carried out with greater energy than heretofore. In order to be prepared for this the Grand Fleet must be based further to the southward and take station at Rosyth and the Humber. Steps had already been taken to prepare these bases for the necessary number of ships, but the regrouping of the fleet could not be carried into effect before all necessary preparations had been fully completed. The only means available for affording a temporary relief to the situation was the detachment of the fast Fifth Battle Squadron from the fleet and to reassign it to the Battle Cruiser Fleet. There were in fact certain reasons why this particular measure should not be longer delayed. As far as was known the *Lutzow* and *Hindenburg* would soon be ready for active service, and this particular fact made it necessary to strengthen the Rosyth forces. For this reason it was essential that the Fifth Battle Squadron replace the Third Battle Squadron, which consisted of the slower predreadnought type of ship, at the earliest possible moment.

This solution of the problem found in Admiral Beatty a staunch advocate. Admiral Jellicoe, on the other hand, saw the necessity for raising serious objections to this plan. Great as was the speed of the Fifth Battle Squadron it still did not appear probable that it could bring the *Lutzow* and *Hindenburg* to battle. Even more important was the fact that according to the battle plan the ships of the *Queen Elizabeth* class were to be utilized as a fast division, which, being kept free from a close tactical relation to the rest of the fleet, could be employed to bring pressure on one wing of the enemy forces or some other portion of the line and thus overcome the disadvantage of the previous rigidity of the battle line. Therefore it was decided that for the time being the Fifth Battle Squadron should remain with the fleet and the contemplated reorganization of the fleet should be held in abeyance until the battleships under construction were ready for commissioning and the strength of the fleet

had been brought up to 24 battleships. In the meantime it was realized that the east coast had to be left as before without adequate protection from enemy attacks. It was, however, necessary to assume this risk if one were to consider the plan from the larger viewpoint. Further, it was not impossible that exactly this weakness would incite the enemy to offensive operations without the necessity for dividing the Grand Fleet.

Every effort, however, must be made to bring the enemy to battle in this case, and as early as the middle of April there appeared to be certain possibilities in this direction. At this time the Grand Fleet had been brought up to the strength contemplated. On the 15th, therefore, the commander in chief was informed that the proposed regrouping of the forces should be effected as soon as the outer anchorages of the Firth of Forth had been effectively protected from submarines. Since the Humber docks had also been rebuilt to accommodate the heavier ships, the Third Battle Squadron and the Third Cruiser Squadron should be transferred to that base. With this arrangement it was expected that in any future attacks on the coast the enemy would be forced to support the attacking forces with battleship squadrons in the immediate vicinity of the abovementioned forces: this would give the awaited opportunity to bring the enemy to battle, but only when the battle squadrons were in a position to support the Humber forces. Admiral Jellicoe was therefore prompted to propose that at least some of his ships be transferred from Scapa to the Firth of Forth as work on the barrier at the latter base progressed sufficiently. At the same time he was informed that the matériel which had been assembled for the barrage across the Dover Straits would be employed at the Firth of Forth. Before these instructions could be carried into effect, however, there followed the attack on Lowestoft. The expected blow of the enemy had fallen before the contemplated countermeasures could be completed. Thus the long-desired possibility of coming to battle was missed. Something had to be done immediately to improve the preparations in case of a repetition of this raid. The Admiralty therefore hastened to demand new proposals from the commander in chief. "The enemy," so they stated, "has felt out our weakness in the southern waters by a practical demonstration and will probably carry out further operations in these waters as soon as possible." Commodore Tyrwhitt had only one light cruiser at his disposition after the battle near Lowestoft, and until the other vessels were repaired the protection of this area would devolve on the commander in chief of the Grand Fleet. Admiral Jellicoe was not inclined to abandon the previous strategy of keeping all his valuable ships back and maintaining the concentration of forces in the north. His one

concession was that he declared himself ready to send the Third Battle Squadron and the Third Cruiser Squadron instantly from Rosyth to the south, not to the Humber but to the Swin, the northern exit from the Thames, or to Sheerness or Dover. Further, the submarines which had been previously based on Rosyth should be transferred to Yarmouth. If in addition to this mine fields were laid near the east coast, these measures should provide sufficient protection against further bombardments of the coast, while the Third Battle Squadron, together with the *Dreadnought*, when repairs on her had been completed, would form a sufficiently strong force to oppose the German battle cruisers at their present strength. This proposal was acceptable to the Admiralty, with the exception of the mine barriers, which were considered detrimental to the freedom of action of the English forces and might prove dangerous. On May 2 the Third Battle Squadron and the Third Cruiser Squadron arrived in Sheerness, while the submarines which were stationed at Rosyth were transferred to Yarmouth, with the exception of two which remained behind.

These were, however, only temporary measures and it was evident since the German attack on the coast that if the regrouping of the fleet was to be effected at all it should be done without further delay. Admiral Jellicoe was not prepared to undertake this regrouping until the antisubmarine defenses to the eastward of the Forth bridge and in the Humber had been completed. Only then did he contemplate basing one squadron of battleships and the First Cruiser Squadron permanently at the Humber while the balance of the fleet was moved from Scapa to the Firth of Forth.

In order to reach the final decision, a meeting was held at Rosyth on May 12, at which the First Lord of the Admiralty presided. Here the conclusion was reached that, aside from the question as to whether or not it was proper to move the concentration of the fleet from the north to the south either permanently or temporarily, the consolidation of the Firth of Forth as the principal base of the fleet was a matter of urgent military necessity. Admiral Jellicoe was also convinced of this, but, as a result of his observation and experience, held that Scapa should be retained as a secondary base, since it offered unusual opportunities for the training of the fleet as well as a base for the Tenth Cruiser Squadron and the forces employed to support the vessels maintaining the commerce blockade. As a third base the Humber should be placed in condition. At the same time it was decided to form a new Fourth Battle Squadron, consisting of all battleships which were armed with 12-inch guns, to be based either at the Humber or some other southern port in accordance with the requirements of the situation. The Forth itself

would be reconditioned in order to accommodate not only the battle cruisers which were stationed there but also the First and Second Battle Squadrons, as well as the Second Cruiser Squadron and the light craft attached to it. It was hoped that all this could be accomplished before the beginning of winter.

No agreement could be reached on the question as to whether it was advisable or necessary to transfer further units from the fleet to the south. As to the proposal that the Fifth Battle Squadron be detached from the fleet and assigned to the Battle Cruiser Fleet, Admiral Jellicoe renewed his opposition and would only agree that this squadron or the newly organized Fourth Battle Squadron be sent to Rosyth when opportunity offered. But since at that time the Third Battle Cruiser Squadron (*Invincible*, *Inflexible*, *Indomitable*) had been sent to Scapa for training, the commander in chief proposed to replace them during this period by ships of the *Queen Elizabeth* class. Thus it came about, as the day of battle approached, the distribution of the fleet was quite different from that assumed in the battle orders. [See fig. 1 for its distribution.] In the opinion of the commander in chief one particular detail of this regrouping violated the fundamental principle of these orders. The fast division, so long as it was based on the Firth of Forth, was not under the immediate orders of the commander in chief.

Another fact which served to weaken the existing organization of the Grand Fleet was that at this identical time a reassignment of the destroyer flotillas was about to be effected. In accordance with a decision which had been reached in August, 1915, the Grand Fleet was to have been assigned six flotillas as soon as the building program could be completed, one for each battle squadron and one for the battle cruisers. In order to accomplish this, the existing number of destroyers had to be increased from 65 to 109, and this could not be done until the older vessels of the First, Second, and Fourth Flotillas had been replaced by new vessels. This program was well under way when early in 1916 the urgent need for light cruisers made a further reorganization imperative. In a conference which took place on January 17 it was then decided to reorganize the flotillas by reducing them from six to four in order to make a number of flotilla leaders available for this service. In this manner, however, the flotillas, three consisting of 24 boats and one with the battle cruisers of 28 boats, became unwieldy. On March 28 Admiral Jellicoe made the following suggestions: The formation of five flotillas, four to consist of 18 boats, of which 2 would form the matériel reserve of the fleet and one flotilla of 28 boats for the battle cruisers, each flotilla to be divided into two half flotillas and each of these to be led by a light cruiser or flotilla leader. The most

important innovation was, following the German practice, that all destroyer flotillas were placed under the command of a single leader, commodore of the flotillas (Commodore "F"). This officer was assigned a light cruiser, H. M. S. *Castor*, as flagship. Owing to the constant influx of new boats these flotillas were in the process of reorganization and the commodore of the flotillas had had no opportunity to exercise his forces in tactical maneuvers before they were put to the decisive test.

The war distribution of the "Grand Fleet" at the end of May, 1916, was approximately as follows [see fig. 1]:

At Scapa Admiral Jellicoe had at his disposal the First and Fourth Battle Squadrons, the Third Battle Cruiser Squadron, the Second Cruiser Squadron (armored cruisers), the Fourth Light Cruiser Squadron, and the Fourth, Twelfth, and only a part of the Eleventh Destroyer Flotillas; in all 35 destroyers ready for service, with 3 light cruisers and 4 flotilla leaders. In addition to this there was one balloon ship and one aircraft tender. [Also the destroyer *Oak* and light mine layer *Abdiel*, attached directly to the commander in chief.] (The Third Battle Squadron and the Third Cruiser Squadron had been sent on May 2 to the defense of the coast near Sheerness.) At Cromarty there were assembled the Second Battle Squadron and the First Cruiser Squadron, together with the balance of the Eleventh Destroyer Flotilla, consisting of 10 boats and 1 flotilla leader. [See top of fig. 3 for a summary of the vessels in the Grand Fleet, or Appendix 5.]

At the Firth of Forth under the command of Admiral Beatty were assembled the First and Second Battle Cruiser Squadrons, the Fifth Battle Squadron, the First, Second, and Third Light Cruiser Squadrons, and 27 destroyers, among which were 10 boats of the Thirteenth Flotilla, while the balance consisted of two divisions of the Ninth and Tenth Flotillas which had been reassigned from the Harwich force, since otherwise the number of boats available with the battle cruiser fleet would have been insufficient for the necessary antisubmarine screens. Also the *Engadine*, the second aircraft tender of the fleet, lay at Rosyth. Finally, there was the recently organized submarine flotilla, the Eleventh, which was designed to operate to the northward of the line Horn Reef to Flamborough Head, while the area to the southward of this line was to be patrolled by the submarine flotillas based on Harwich and Yarmouth.

When the Grand Fleet put to sea on May 30 the following vessels had to remain behind in the docks and harbors, viz, the battleships *Royal Sovereign*, *Queen Elizabeth*, and *Emperor of India*, and 17 destroyers. The fleet was comprised during the battle of 24 dreadnoughts, 4 *Queen Elizabeths*, 9 battle cruisers, 26 light cruisers,

5 destroyer leaders, and 74 [this apparently includes both *Oak* and *Abdiel*] destroyers.

Aside from this most powerful fleet which the world had ever seen, there still was the Harwich Force available for employment against the enemy, consisting of 5 light cruisers, 2 flotilla leaders, and about 17 destroyers, although it was doubtful from the beginning whether or not these forces could be utilized at a given instant owing to their great distance from the scene of action.

The German High Seas Fleet [see Appendix 7 for the complete organization of the High Seas Fleet], on their side, was concentrated principally in the Jade. Aside from the fleet flagship there were assembled ships of Battle Squadrons I and III, totaling 17 first-line ships, of which the *Konig Albert* was not ready for service. The latest battleship, the first to be equipped with 38-cm. guns (15-inch) was S. M. S. *Bayern*. This vessel had been in commission since March 18, but was engaged in trial trips and exercises in the Baltic and was only available for active service in emergency in the event of an attack on the coast.

Battle Squadron II, consisting of older vessels of the *Deutschland* class, lay in the Elbe. These ships were equal to the British Third Battle Squadron. The scouting forces, which had recently been augmented by the battle cruiser *Lutzow*, were also concentrated in the Elbe, and consisted of five battle cruisers of Scouting Division I, ["scouting division" is used throughout this translation for the German term "scouting group," because the former term is used in the figures at the end of the translation and has been used for the last 10 years by the Naval War College], four 6-inch gunned light cruisers of Scouting Division II, four light cruisers of Scouting Division IV, to which later was added S. M. S. *Hamburg*, the flagship of the leader of submarines. Scouting Division III, consisting of older cruisers, had been assigned to the commander in chief of the Baltic forces since April 20, 1915, and on January 15, 1916, had been disbanded. On the other hand, the light cruisers *Graudenz* and *Stralsund* were in the dockyards at Wilhelmshaven and Kiel for installation of their 15-cm. (6-inch) armament. The destroyer ["destroyer" is used instead of the German name "torpedo boat" throughout this translation] flotillas, led by the *Rostock* and *Regensburg*, had a normal strength of 12 boats to a flotilla; 1 boat was always in material reserve, giving a maximum operating strength of 11 boats. Flotillas II, V, and IX were at this strength; but 4 boats of Flotilla III, 7 of Flotilla I, and 2 of Flotilla VI were undergoing repairs in the dockyard at Kiel. In all there were therefore 62 destroyers, 11 light cruisers, 6 older battleships, 5 battle cruisers, and 16 first-line battleships ready for service.

Thus the comparative strength of the two fleets of Jutland was as shown by the following table, viz:

	First-line battleships	Battle cruisers	Older battleships	Armored cruisers	Light cruisers	Flotilla leaders	Destroyers
German	16	5	6	0	11	0	[1] 61
British	28	9	0	8	26	5	74

[1] The numbers of German destroyers in fig. 3 are in error. There were actually 31 destroyers with Scheer and 30 with Hipper. *V–186* had broken down during the morning of the 31st and returned to port, thus reducing the total number of destroyers to 61.

The British superiority was, therefore:

In battleships, 37:21.

In light forces, 105:72.

Above list does not include the Harwich Force.

Chapter 8

SKAGERRAK

PLAN OF OPERATIONS AND STRATEGIC DEPLOYMENT

In consideration of the operations which had been planned by the Germans for the middle of the month, there had been a certain easing up in the service requirements after May 8 with the idea of saving both personnel and matériel, since at that time the general situation did not appear critical. Thus the sailing orders for all ships not actually on patrol service were extended to six hours. Further, the period of readiness for sea for the severely overtaxed destroyer flotillas was also considerably extended in order that sufficient opportunity might be given to recondition and overhaul machinery in preparation for the coming offensive. On May 9 the commander Battle Squadron III, Rear Admiral Behncke, returned with the *König*, *Kronprinz*, *Kaiser*, and *Kaiserin* from exercises in the Baltic, and all was in readiness for the operations planned for May 17 when several ships of Squadron III developed condenser trouble, necessitating the postponement of operations until May 23. In order that this interval of enforced inactivity might not be wasted and since there were no reports at hand indicating an immediate offensive on the part of the enemy, Squadron II and the first leader of destroyers with his flagship *Rostock*, Destroyer Flotillas III and IX, as well as the Thirteenth Half Flotilla were sent to the Baltic for training. On the 15th the *Lutzow* also followed. All forces were ordered to rendezvous in the North Sea on the morning of May 23 ready for action. It was believed that the English forces were divided between the harbors on the north coast of Scotland, the channel, and the Humber. The basic plan of operations was then as follows: At dawn on a certain date the scouting forces, accompanied by three of the fastest destroyer flotillas, were to appear off Sunderland [just to southward of Blyth in fig. 6] and bombard the most important military works, thus inciting the enemy forces to advance. In order to attack these forces Battle Squadrons I and III, with Scouting Division IV, and the rest of the destroyer flotillas were to take station between the southwest shoal of Dogger Bank and Flamborough Head [slightly north of Hull], about 50 miles to the eastward of the latter. In

the meantime the submarines of the fleet were to take station near Scapa Flow, the Moray Forth [the bay northeast of Cromarty], the Firth of Forth [the bay east of Rosyth], the Humber [the river on which Grimsby is located] and to the northward of Terschelling [the island just south of *L–16* in fig. 6], while those of the naval corps in Flanders should take station for attack near the mouth of the Thames, other boats of this force having previously laid mine fields in the vicinity of the important harbors. In addition all airships were to be employed in this offensive; those which were not utilized for the immediate protection of the scouting forces were to conduct a reconnaissance over the Humber, toward the Firth of Forth, the Hoofden, and Skagerrak. At first it was decided to leave Battle Squadron II behind for the protection of the German Bight during the absence of the fleet, but on the urgent representation of the commander of this force, Rear Admiral Mauve, it was agreed that in spite of the inferior armament and resistance of these older vessels they should be allowed to participate in the offensive.

When it became apparent on May 13 that the operations scheduled for May 17 would have to be postponed until the 23d, the leader of submarines, Commander Hermann Bauer, proposed that the submarines which were ready for service should be dispatched to the North Sea on a scouting expedition in order to gain the necessary information for the pending fleet offensive. This force was to cover that particular area which previous experience and observation had shown was occupied by the British fleet when supporting a raid of the light forces on the German Bight or when expecting a German offensive. Admiral Scheer agreed to this proposal. Therefore, on the 17th and 18th, 10 boats were ordered out to scout for enemy warships until May 22 in the area between the latitude of Jaderen [on the Norwegian coast just west of the name "Norway" in fig. 6] and Hanstholm [on the Danish coast just north of the letter "u" of Jutland in fig. 6] from the Norwegian coast to a point about 100 miles eastward of the Firth of Forth. The following boats were sent out: *U–52*, *U–24*, *U–70*, *U–32*, *U–66*, *U–47*, *U–43*, *U–44*, *U–63*, and *U–31*. These boats were distributed in the above-mentioned order in sectors extending from west to east, each sector being about 15 to 20 miles wide and 100 to 120 miles long. In these sectors they were to cruise on northerly courses and in case of being sighted were to conduct themselves in such a manner as to give the appearance of being engaged in commerce raids or else bound for the west coast of the British Islands. From May 23 on they were to take station near the enemy bases [fig. 6 shows their positions for 3 p. m., May 31. The lower position of *U–24* off Blyth is in error. This posi-

tion was not taken by *U–24* until June 1. During May 21–22 *U–47* occupied this position]. *U–43* and *U–44* near Pentland Forth, while the remaining boats occupied sectors near the Firth of Forth, remaining there 10 days, each boat cruising in sectors which, overlapping, had a common center in the exits from the bases in question. Within these sectors the submarines were given freedom to close in to the coast or to stand out to sea according to the weather conditions, the counteroffensive measures encountered, and the experience of the crews, some of which were new to this service. It was of greatest importance, however, that they should not be prematurely discovered. Radio was not to be employed except in great emergency, in particular upon sighting enemy warships, when it was to be used only after every existing opportunity for attack had been utilized. In order to inform the boats of the fact that the fleet operations were about to commence it was decided to broadcast the time of putting to sea with the phrase, "Prepare for enemy forces standing out." In this manner it was hoped that in case any boats had left station on account of machinery overhaul, to rest the crew, or for any other reason, they might be brought back in time for attack.

In addition, another boat, the *UB–27*, was sent out on the 20th to penetrate the Firth of Forth and, inside of May Island, to await opportunity to attack the warships leaving or entering. The performance of this mission was estimated at 14 days. Another special problem fell to the lot of the *U–46*. On the night of May 22–23 this boat was to take station off Sunderland—the probable objective of the German offensive—to scout and observe the patrol, the commerce, navigational aids, and the mine fields, and to report the results in special code words. Under no circumstances was the locality to be mentioned. After this the boat was to occupy station, waiting between the Firth of Forth and the Moray Firth, near Peterhead. Since, however, the *U–46* was not ready for service at the time, this problem fell to the lot of the *U–47*, which latter boat should have been with the other flotillas operating in the North Sea. Aside from this the larger mine-laying submarines, *U–72*, *U–74*, and *U–75*, were to proceed to the Firth of Forth, Moray Firth, and to the westward of the Orkney Islands and lay mine barriers of 22 mines each. Should the pending operations be carried out immediately after the mine fields were planted as planned, it was probable that the enemy would not have sufficient opportunity to discover and sweep these fields before standing out. Even though the mines were prematurely discovered it was hoped that their presence would delay the fleet in putting to sea. Having stood out on this mission on May 13 the *U–74* was followed on May 23 and 24 by the other two boats.

Furthermore, in order to keep the Humber under observation, in which, in accordance with reports of a steamer on May 14, there were a larger number of vessels assembled, including battleships, the *UB–21* and *UB–22* stood out on May 22. These boats were to take station from May 23 to the northward of the line extending from the peace time position of Spurn Point Lightship to Outer Dowsing Buoy, there to remain for 10 days. Finally another line of submarines was to be established to the northwestward of Terschelling in order to protect the fleet from flank attacks in this direction during the pending operations. For this mission the Chief of the Fourth Submarine Half Flotilla, Lieutenant Commander Prause, was selected and accordingly put to sea with the *U–67* and *U–46* on May 22. The *U–22*, which should have been attached to this flotilla, was left behind, not being in readiness.

The enemy, being occupied with similar preparations, had also put out a line of submarines; thus the commander in chief, in addition to the usual submarine blockade of the German Bight on May 15, had sent the *D–7* and *E–30* to take station in the Kattegat to observe the exit from the sound near the Anholt Island. Another submarine put to sea on May 18 to cruise in the vicinity of Goteberg, while the same day the British commander in chief was informed, through their excellent system of communications and secret service, " from a reliable report " that an exceptionally large number of German submarines were operating in the North Sea. (Jellicoe: The Grand Fleet, p. 294.)

Since, however, everything was so quiet on the German side after the operation against Lowestoft, the British were not prepared to assume from this fact alone that a large-scale offensive was pending. It was known that after the aircraft attack on Tondern near the beginning of May Squadron III had been sent to the Baltic for tactical exercises, and the submarines on patrol service near the German Bight reported that aside from the regular movements of the mine-sweeping division and the boats on patrol there was no undue activity among the German men-of-war. Thus, in spite of the fact, which became known on May 22, that at least eight and possibly more submarines were operating in the North Sea, the enemy were inclined to believe that this had to do with a resumption of commerce raids rather than a fleet action. Accordingly, the vessels of the Tenth Cruiser Squadron were withdrawn on May 19 from their usual blockade stations directly across the North Sea to positions as far to the westward as possible. Furthermore, the patrols in the vicinity of the fleet bases were strengthened and special measures taken to protect vessels standing in or out of the bases from submarine attacks and to safeguard them from mine fields which might be laid by outlying German submarines. In particu-

far the mine sweepers attached to the fleet were engaged in sweeping, beginning May 21 and each day subsequently, in the vicinity of the "Long Forties," through which the fleet was accustomed to pass en route to the southward. From May 23 on special deep mines were laid in the Moray Forth to prevent the penetration of submarines into the bases.

The German submarine offensive therefore did not find an unprepared enemy. As the 10 boats designated for scouting in the North Sea stood out, 3 to the westward and the others to the east of Terschelling, the *U–52*, Lieut. Commander Hans Walther, sighted a destroyer 90 miles north off Terschelling and the submarines *U–66*, Lieut. Commander von Bothmer, and the *U–63*, Lieut. Commander Otto Schultze, sighted a number of patrol vessels near the Dogger Bank and the Great Fisher Banks. In the area assigned for their activities no important war craft were sighted, although radio messages from Brugge reported an enemy squadron near Bergen, other enemy warships near the Humber, and a number north of the German Bight. As a consequence some of the German submarines habitually cruised submerged at night. Further, the counter measures of enemy patrols were restricted chiefly to the left wing of the submarine line and were encountered chiefly by the *U–52* off the Firth of Forth.

Since the visibility conditions were generally very good, the masts and smokestacks of fishing vessels were continually in evidence, with the result that the submarines were forced to submerge or deviate from their course, a fact which greatly increased the difficulty of a general survey of the area. As early as the 20th, the *U–52* was probably sighted by a steamer, which immediately after the event put back to the Forth at full speed. On the next day at about 9 a. m. the *U–52*, while 110 miles to the eastward of Aberdeen, sighted a submarine followed by a small cruiser and about 12 destroyers or subchasers. These were reported by radio through the *Arcona* which was the relaying vessel for submarine communications. In the scouting line this message was picked up only by the *U–43* (Jürst) and the *U–66* (Von Bothmer), although it was repeated by the station at Brugge. On May 22 the *U–52* had another encounter with 12 subchasers and 1 destroyer. Both times it was impossible to avoid these craft, and the submarine was forced to seek safety by submerging to 25 fathoms. It is probable that the submarine had been located by the radio direction finders upon sending out the message on the preceding day, and this accounted for the increased antisubmarine activities of the enemy.

As subsequent events proved, the advance of the Grand Fleet which was brought about by a sortie of the German fleet, actually covered the greater part of the area in which the submarines had

been cruising up to the forenoon of May 22. Further, the rendezvous of their forces lay in this area. The field of operations was therefore in itself very happily chosen. Unfortunately, the German fleet offensive had not yet begun when the submarines, in compliance with their orders, left this field to take station off the Pentland Firth and the Firth of Forth, which disposition of forces, in accordance with the original plan, should have given the submarines further opportunity to attack the vessels returning to port after the battle.

As the situation actually developed these boats were forced to maintain position immediately off the enemy bases for a long period, meanwhile being subjected to the full force of the enemy antisubmarine activities.

In the meantime the ships of the High Seas Fleet which had been sent to the Baltic for training had returned to the North Sea, according to plan, on May 22, but the pending offensive which was to have been initiated forthwith had to be postponed again. The reason this time was inadequate repairs to the battle cruiser *Seydlitz*. This vessel, which had struck a mine in the operations of April 24, had been reported ready for service on May 22 by the dockyard at Wilhelmshaven; but a flooding test which was made as a precautionary measure on the night of May 23–24 showed that a broadside torpedo room which had been damaged by the mine was not watertight, while the leaks in the transverse and longitudinal bulkheads were so numerous that further repairs were essential. As the commander in chief did not wish to relinquish this ship and repairs could not be completed before May 28 [in view of the severe damage sustained by the *Seydlitz* at Jutland, it was fortunate that the repairs were properly made], it was necessary to again postpone the undertaking till after May 29, for better or worse. In the meantime the orders which had been issued extending the sailing orders for ships at the docks and in the harbors remained in effect, except that further patrol and torpedo boat scouting operations were to be inaugurated in the German Bight to keep the exits of the fleet clear of mines and submarines. Further, the commander of the naval airship detachment received instructions to carry out air raids over the northern and southern portions of the English east coast but not to alarm the central portion, which was to be the objective of the fleet objections. Since the weather conditions remained unfavorable up to the end of the month, the scouting operations at the extremity of the German Bight were restricted to the frequently interrupted flights of the aircraft from List, Helgoland, and Borkum, and the patrol cruises of the mine-sweeping and barrier-breaking divisions. On this mission the air squadron from Helgoland, *562* and *483* under

Lieutenant Rogge, sighted an enemy submarine on May 24 about 35 miles south of Horn Reef. This submarine lay on the surface in the vicinity of the Danish steamer *June* and attempted to ram the seaplane L 53 when the latter landed on the surface for the purpose of searching the steamer. It appeared not improbable that there was cooperation between the steamer and the submarine. Therefore Destroyer Flotilla VI, Commander Max Schultz, was dispatched to the northward to patrol the area between Horn Reef and List during the following night (24–25) and, if possible, to bring in this steamer This search proved fruitless, as did its repetition during the next night by Flotilla IX, under Commander Goehle.

In the meantime the *U–43* and *U–44* had taken station in their sectors off the Pentland Firth, while *U–66*, *U–63*, *U–51*, *U–32*, *U–70*, *U–24*, and *U–52* had closed in on the base at the Firth of Forth according to plan. In this movement the *U–52*, while proceeding toward the Firth of Forth on May 22, ran into a net while cruising under the water at about 6 a. m. when 90 miles ENE. on May Island. [Off Rosyth. See fig. 2.] By submerging to a depth of 50 meters the boat was enabled to get clear, but found on investigation the next night that both legs of the mine-cutting device had been bent and that the head of the middle periscope had been broken off. Of the other boats which were proceeding toward the coast, the *U–32*, Lieut. Commander Count Spiegel von und zu Peckelsheim sighted a sloop of the *Arabis* class and *U–63*, Lieut. Commander Otto Schultze, when 180 miles to the eastward of Cromarty Forth sighted an old cruiser with one destroyer, two smaller craft, and a submarine which turned off before an attack could be made. Judging from intercepted radio messages the presence of this submarine must have been reported, since on approaching the coast it had to break through a strong line of patrols and on May 23 laid a course near Tod Head along the coast in order to reach the assigned sector. On the evening of the same day the *U–51* (Rumpel) sighted a large auxiliary cruiser of about 10,000 tons, with one destroyer, about 50 miles northeast of May Island. At 7.30 p. m. these vessels passed the submarine at a distance of about 6,000–7,000 meters at full speed on a southerly course. At 8.40 p. m. these were also sighted by the *U–70*, Lieut. Commander Wünsche. Since this auxiliary cruiser might be employed as a mine layer on account of the peculiar shape of the stern, and was holding a course toward Amrun Bank [to southward of Sylt, fig. 6] it was reported by radio by the *U–70*. In the meantime one of the boats stationed off Pentland Forth, the *U–43*, sighted two cruisers of the *City* class near the entrance at 7 p. m., but owing to machinery derangements was unable to approach within torpedo range.

Furthermore, the weather was unfavorable for submarine operations with the exception of two days; either the sea was absolutely smooth so that the periscope betrayed the presence of the submarine, together with low-visibility conditions which changed to fog near the coast, or else there was so much sea and spray that horizontal steering at the depth for attacking was very difficult and vision through the periscope impossible. In addition to this it soon developed that the submarines in those sectors nearest the coast were being subjected to increasingly sharp antisubmarine operations from which they could not withdraw out of their restricted areas without entering the sector assigned to the neighboring submarine, thus hindering the latter. At a place about 10 to 15 miles to the eastward of May Island, where all boats had equal chances for attack, the sectors were only from 3 to 4 miles wide, a fact which considerably endangered the submarines, since it was learned that the British were using their own submarines to hunt down the Germans. From the English radio messages it was soon learned that individual boats had been sighted and that an energetic search had been organized, while at night even cruisers and destroyers were employed.

In the meantime the *U–47*, Lieutenant Metzger, had carried out its survey in the neighborhood of Sunderland during the night of May 21–22 in accordance with the plan. He determined that the city was well screened toward the sea, lights being extinguished and even smelting ovens giving no reflections which might serve as a navigational light. As far as could be judged from the commercial traffic no mine fields were to be expected near the coast. After making these observations, which were transmitted to the commander in chief on the 23d by means of special code words, the submarine stood out in a wide sweep toward the Firth of Forth to take station near Kinnaird Head.

Simultaneously with the other boats, the *UB–27* (Lieutenant Commander Dieckmann) had arrived off the Firth of Forth on its special mission. On May 23 this boat fell in with the *U–32* and then with the *U–63*, obtaining from them the reports which had been received in the meantime from Brugge in regard to the enemy forces in the North Sea as well as the latest dispatches; then, while the *U–63* diverted the patrol, *UB–27* laid a course for the Firth of Forth past Bell Rock. Soon after midnight the boat was forced to reduce speed due to machinery derangements, so that the commanding officer decided to steer for St. Andrews Bay in order to effect repairs. During the same night (23–24) while the *U–63* (Schultze) was cruising on the surface close in to the Firth of Forth, a light cruiser of the *Arethusa* class was sighted at 2.45 a. m. This cruiser approached so rapidly that although the submarine immediately

swung to a parallel course it could not utilize the opportunity for a certain shot at from 300 to 500 meters and was forced to submerge to avoid attack from gunfire. A second craft which followed the cruiser with screened lights at a distance of about 2,000 meters could not be clearly distinguished. This circumstance showed that Bell Rock was probably the point of approach for all entering and leaving vessels, and the commanding officer therefore decided to cruise further in this vicinity.

In the meantime the *UB–27*, before it could reach St. Andrews Bay, where it intended to lie on the bottom, sighted, at 7 a. m. on May 24, four armored cruisers, apparently of the *Monmouth* class, standing out of the Forth in column some distance away, while to the southward of these were numerous destroyers. Since these vessels steamed to the eastward at full speed, the attack which had been initiated had to be abandoned. The hope remained that these cruisers might be only the advance screen of a strong main body. Therefore the *UB–27* proceeded at full speed to the southward toward North Carr Lightship. At 8.30 a. m. the outlines of two cruisers or destroyers were sighted to the eastward but disappeared toward 9 o'clock without other vessels following. Presumably the ships in question were the Fourth Light Cruiser Squadron, which, according to subsequent English reports, had left Rosyth under destroyer escort on May 24 to cruise off the Norwegian coast from Lindesnes to Utshire [the coast extending northwestward from *The Naze*, fig. 6], thence to return to Scapa. On May 24 the *U–72* (Krafft), while about 120 miles to the westward of Hansholm en route to the Moray Forth, sighted three small cruisers of the *Calliope* and *Cordelia* class behind two submarines in line of bearing on an easterly course, which passed ahead of the submarine at such high speed that no torpedo shot was possible. At 8.30 a. m. on May 25, while 120 miles to the northward of Kinnaird Head, this submarine sighted two other vessels of the *Cordelia* class, this time on a westerly course, but again failed to gain position for attack.

The commanding officer of the *UB–27*, having waited in vain for the appearance of the fleet until 9.30 a. m. on May 24, concluded that the enemy had either gained the open sea by way of Bass Rock or else was still in the Firth of Forth. In the latter case it seemed essential that the attempt to penetrate the harbor be made at night. Before this was undertaken it was necessary to proceed to St. Andrews Bay to rest on the ground in order to repair machinery derangements. When this had been accomplished Lieutenant Commander Dieckmann steered for May Island, submerged, penetrated the line of destroyers at daybreak, and followed two or three steamers into the Firth of Forth. Not until after 18½ hours submerged cruising

could the boat come to the surface after this successful penetration of the Forth, but at 2.45 a. m. on May 25 it was able to rest on the ground in Largo Bay with charged batteries. At 5 a. m. the next morning, while this boat was proceeding at periscope depth in order to push in further toward Inchkeith, there suddenly occurred a grating and rumbling noise as though some trash or heavy weights were being dragged across the decks. Since, however, the boat steered well horizontally no further importance was attached to this. At 6.30 a. m., as the commanding officer took a look around through the periscope, he was surprised to see a long chain of green glass balls streaming astern. The submarine was trailing a net, in which it had probably become entangled during the night in Largo Bay. At any minute the boat might be betrayed by it. The commanding officer turned to the northward, sounded a 35-meter spot, and then attempted to clear the net under water by backing both engines. In this attempt the net became foul of both propellers and brought them to a stop. To come to the surface was out of the question. There remained nothing else to do but to submerge to 40 meters and rest on the bottom until dark. After all preparations had been made to clear the net and to blow up the submarine in the event of a surprise attack, the boat came to the surface at 10.30 p. m. (May 25), after being under the water for about 20 hours, and found light, misty weather, favorable to the undertaking.

Thanks to the determined efforts of the crew the net was cleared inside of 20 minutes and stowed in the boat. The port propeller, however, still remained foul and therefore further stay in that vicinity was out of the question. As the boat was preparing to put out from the Forth to clear the port propeller in the open sea it encountered another grave danger. Shortly after midnight, while steaming on the surface and attempting to pass between two patrol vessels, it was suddenly brought to a standstill, being caught in a net which was apparently suspended between these patrol vessels. This net immediately began to burn with small flames along its entire length, but the submarine succeeded in cutting through in 10 minutes before the patrol could approach, and thus gained its freedom. Another net was encountered shortly after this; nevertheless the boat was able to pass by the Elie net off May Island at 2.31 a. m. on May 26 and came to the surface at 7 a. m. about 10 miles to the eastward of the island.

As the position of the smoke in sight indicated, the *UB–27* found herself in the midst of a number of patrol vessels which were disposed in checkerboard fashion in all directions. At 10.40 a. m., May 26, the boat sighted a large auxiliary cruiser of about 10,000 tons coming up from the southeast and steering to the eastward.

Although the distance was over 3,000 meters the torpedo was fired, since the commanding officer did not believe he could safely make a closer approach, owing to the lack of the port propeller, and a better opportunity for attack was hardly to be expected on that trip. The torpedo missed, the attempt proving that with only one propeller it was difficult to hold the boat in position during the shot. Since it developed that the steel cable which was around the propeller could not be cleared in spite of all efforts, the *UB–27* started for port on May 27, arriving at Helgoland on May 30.

Furthermore, the *U–72* (Lieutenant Commander Krafft) was forced to abandon its undertaking on May 26. On that date, when about 100 miles to the eastward of Moray Forth, where the mine field was to be laid, a heavy seaway showed that one of the outer oil tanks was leaking, resulting in an oil track which became more pronounced after the boat submerged. Aside from this the oil engines began to develop trouble, and since the nights were becoming shorter the successful carrying out of the mission appeared doubtful. The *U–72* therefore started on the return journey on the 27th, arriving at Lister Deep on May 29.

In the meantime the other submarines stationed before the Humber, Pentland Firth, and the Firth of Forth proceeded with firm determination to carry out their thankless mission, but sighted only subchasers, patrol vessels, and destroyers. Owing to the energetic defence measures, the low visibility, and fog they were frequently forced to remain submerged during the day and were often forced far out toward the open sea. These countermeasures were particularly severe close to the coast, and especially near the channel which led from the Firth of Forth to the northward past Bell Rock and May Island. As a result the boat which was on the northern end of the line, *U–66*, under Lieutenant Commander von Bothmer, suffered most severely from these defensive measures. If it were to remain unseen—and only then could it hope to achieve its mission of attacking important men-of-war—it was forced to remain under water from 3 a. m. until 10.30 at night. Under these circumstances the possibilities for making observations in that zone were extremely limited. Hence it appeared to the commanding officer that it would be more advantageous in the future to leave the coast areas to the smaller boats and for the larger and faster submarines to operate outside the line of patrols. Being able to cruise on the surface they could intercept radio messages and thereby improve their position. In accordance with these views he resumed his activities outside the line of patrols on May 25 and toward evening fell in with the *U–47* (Metzger), which was cruising between Kinnaird Head and Peterhead. The next morning (May 26) the *U–47* was sighted by a fishing steamer in thick weather before it could submerge. On the day

following (May 27) the *U–74* (Wiesbach) was engaged in a fight with the armed fishing vessels *Ranger*, *Bodino*, *Oku*, and *Kimberly* while on the "Long Forties" and was sunk with the entire crew about 25 miles to the southeast of Peterhead. Whether this occurred before or after the completion of the mine-laying mission off the Firth of Forth will never be known. [Note "Y," fig. 6.]

The presence of German submarines in the vicinity of Pentland Firth was soon determined, and on May 27 the flotilla leader *Broke*, with 12 destroyers, stood out from Scapa to strengthen the patrol. The *U–43* (Jürst) and *U–44* (Wagenführ) were pursued by these vessels on that date and for several days following. There were a number of opportunities for torpedo attacks on these destroyers, but the commanding officers refrained in order not to betray their position prematurely. On May 29, after intercepting considerable radio traffic which indicated an energetic antisubmarine offensive, the *U–44* submerged to 20 meters and shortly thereafter heard the propeller noises of a destroyer passing overhead. It was 5 a. m. on May 30 before the submarine was able to come to the surface. On the same day *U–43* sighted, at 12.30 p. m., 12 vessels of the *Foxglove* class, which were at first thought to be light cruisers steaming in closed search formation. The submarine fired a long shot at six of the overlapping craft at a distance of between 2,000 and 2,500 meters, but missed. As the shot, however, was observed by the *Gentian*, one of the mine-sweeping gunboats, a half flotilla of destroyers, together with a number of aircraft, left Scapa immediately to search for the submarine. While the *U–43* withdrew from the chase as rapidly as possible, the *U–44*, which was steering a course that forenoon toward Pentland Skerries, ran into the full patrol force. It appeared in the forenoon from the increased radio traffic that the boat had been sighted from ashore and therefore was proceeding seaward through the middle of the sector when it encountered the destroyers and toward midnight was forced to submerge to a depth of 20 meters. Shortly thereafter a destroyer passed over the submarine at high speed.

While in this manner the attention of the enemy was concentrated on the area to the eastward of the Orkney Islands, the *U–75*, Lieut. Commander Curt Beitzen, had proceeded on a wide arc on the 27th past all patrols and supervision from Utshire to the northward of the Shetland Islands and approached the islands from the westward during the night of May 28–29. [Note Z, fig. 6.] Owing to constant overcast sky and frequent fog the boat had had no fix since leaving Norway, so that at midnight a large darkened warship was sighted in the last minute, too late for a torpedo shot. Later the weather cleared, and at about 1.10 a. m. the lighthouse at Noup Head was made out. It had been determined by previous expe-

rience that to the southward of this point, between Marwick Head and the Brough of Birsay, there was a passage for men-of-war about 2 miles off the coast, which the *U–75* was to block. This was done. Entirely undisturbed by enemy patrols the boat laid several separate lines from 6 to 8.35 a. m. at a depth of 7 meters below the low-water level, a total of 22 mines, and started on the return trip.

Meanwhile, on May 28, near the Firth of Forth, the *U–66* had exchanged experience and news with the *U–51* and the *U–63*. Apparently the pending fleet offensive was not yet under way, while it developed from English radio messages which the *U–63* had intercepted, that a German submarine had been sighted near Bell Rock and the whole patrol force had been alarmed. On May 27 the English submarine *E–30* was sent to join the chase, so that on several occasions a fight between two German submarines under water was narrowly averted. On the 28th the *U–63* was chased for six hours by enemy patrol forces. As a result the *U–66* proceeded northward to the limit of the assigned area. Since at this point strong antisubmarine measures were also encountered from fishing steamers and systematic night patrols, possibility of success seemed small, and the commanding officer on his own responsibility decided to abandon his assigned area on May 30 after reporting by radio. In order not to disturb the *U–63* and the *U–47* he took station on the line Scapa Flow to Horn Reef about 60 miles to the eastward of Peterhead. [This position is shown in fig. 6.] This decision was later justified when the boat was enabled to make an important report from its self-selected operating area. Meanwhile the *U–65* intercepted a radio indicating that in all probability H. M. S. *Trident* would cross the sector of the submarine during the following night, and in fact a ship of this description did appear at 10.30 p. m. A torpedo fired at 1,000 meters missed.

The exertions of the submarines stationed near the Humber had also been in vain. For six days the sea had been like a mirror where sea, sky, and horizon were blended in the periscope. The nights were so light and bright that only under the greatest difficulties were the boats enabled to charge batteries inside the lines of the patrol without being discovered and were frequently forced to go to the bottom after charging. On the evening of the 24th the *UB–22* (Putzier) had, in fact, sighted six large auxiliary cruisers painted blue, from 3,000 to 4,000 tons, while the *UB–21* (Hashagen) discovered a mine-sweeping gunboat of the *Foxglove* class; aside from this no further men-of-war had been sighted except destroyers. In the event that warships were standing in or out of the Humber the commanding officer of the *UB–21* assumed that they must be passing closer in to the coast. Therefore on May 28 he left his previous

station in order to cruise between Spurn Point and Flamborough Head, in spite of the fact that the patrol had evidently been strengthened since the 27th. In the observation stations to the northwestward of Terschelling, which had been occupied since May 23 by the *U–67* (Lieutenant Commander Nieland) and the *U–46* [*U–46* was just to southward of *U–67*] (Lieutenant Commander Hillebrand), nothing of importance had developed to date. The *U–67* had sighted at daybreak of the 23d about 20 destroyers 40 miles NNW. of Terschelling which were steaming on a westerly course, but contrary to expectation they were not followed by larger units. On the other hand, it soon became apparent that the Terschelling Bank was the field of activity of a number of enemy submarines, whereby the possibility of remaining on the surface was very much reduced, as far as the German submarines were concerned, and their usefulness considerably impaired. At night the presence of a large number of floating mines further made a cruise on the surface very hazardous. In spite of all precautions the *U–46* was surprised by an enemy submarine on May 24 and attacked by gunfire and later, when about to warn the *U–67*, came into further grave danger from a torpedo attack. On the 27th it was again surprised in foggy weather by an enemy destroyer, but was enabled to submerge and escape before the enemy could open fire. On May 30 the *U–46* was forced to return to Emden for the replacement of the single periscope with which the boat was equipped, as this had become unserviceable from leakage of water.

The prescribed period of waiting had thus come to an end for the boats stationed off Scapa, the Firth of Forth, the Humber, and Terschelling, and with the exception of the *U–46* and the *UB–27* none of the boats had left their stations. This was the situation when on May 30 the long-waited message from the cruiser *Arcona* and from Brugge, " Prepare for enemy forces standing out on May 31 and June 1," announced the time set for the beginning of the German fleet operations.

As early as May 28 decisions of far-reaching importance had been made on the fleet flagship. In accordance with the existing orders the submarines were to leave their observation posts on the evening of June 1. If the cooperation of these boats was to be effective an early departure of the fleet was demanded. On the other hand, in the event of a close approach to the bases of the enemy the cooperation of the airships was necessary, since such an advance would lead the fleet into an area where it could not afford to accept battle against its will. Owing to the unfavorable weather conditions there seemed to be no prospect of employing the airships. In the event that these conditions did not change before May 30 there remained

no alternative but to abandon the operation against Sunderland for the time being. In that case the plan was to advance into the Skagerrak, where the coast near Jutland would furnish a certain protection against surprise from this quarter [on the other hand, the Jutland coast presented a barrier against which the High Seas Fleet could be driven and trapped by superior forces. See fig. 2], and the distance from the enemy bases would considerably reduce the chances of the fleet becoming involved in battle unwillingly. Consequently air reconnaissance would be less essential in this area. Corresponding operation orders were issued to the commanders of the various forces on the same day (May 28).

Final decision was reserved by the commander in chief, although the advance toward the northwest seemed to hold the greatest promise. At midnight all vessels lying in the harbors and at the docks were ordered to get up steam and clear for action. Toward noon on May 29 the *Seydlitz* reported ready for service. On the morning of the 30th there were easterly and northerly breezes in the German Bight, so that for the time being there could be no air reconnaissance, and the commander of the airship detachment, Commander Strasser, reported that none could be counted on for the next few days. Consequently the operations against Sunderland had to be definitely abandoned and instead an advance to the northward substituted. While the ships of the High Seas Fleet were quietly assembled in the outer roads, where they anchored preparatory to standing out, the fleet as well as the naval corps, received the broadcasted code words "31 May Gg 2490" (the number of the operation order), indicating the date set for the operations to begin. Thereupon, near midnight May 30–31, the chief of the Flanders submarine flotilla stood out from Zeebrugge with all available submarines at that station in order to protect the fleet against any attack of enemy forces from the direction of the Thames.

The purpose of this new undertaking was the same as that in the preceding plan against Sunderland, namely, to draw the enemy out from their bases. Only in this case the purpose was not to be accomplished by a bombardment of the coast, but by the appearance of the German cruisers in the vicinity of the Skagerrak. Vice Admiral Hipper, commander scouting forces, therefore received orders to leave the Jade at daybreak on the morning of May 31 with Scouting Divisions I and II, the second leader of destroyers on the *Regensburg*, and Destroyer Flotillas II, VI, and IX. He was to proceed to the northward outside of visibility of the Danish coast and to show himself off the Norwegian coast before dark in order that the English might obtain information as to the undertaking. Later during the afternoon and following night he was to conduct commerce raids

near and in the Skagerrak. In the event of meeting enemy warships, which had been frequently reported in this zone, he was to engage and defeat them; but in case of encountering superior forces and lacking air reconnaisance he was to draw them toward his own fleet. At the same time Admiral Scheer proposed to take position at 5 a. m., June 1, 45 miles to the southward of Lindesnes to support the cruisers with Battle Squadrons I and III, Scouting Division IV, the cruiser *Hamburg*, the first leader of destroyers on the *Rostock*, and the remainder of the destroyer flotillas. The further disposition of forces would be determined as the situation developed.

At the last minute, however, Admiral Scheer decided to alter this original plan, which was also based on airship reconnaisance, in two essential points. First he ordered that Battle Squadron II, which was to have been held in reserve for coast defense in the absence of the fleet, with the time for joining forces with the fleet held in abeyance, should take position with the fleet from the start. Of still greater importance was the decision to have the fleet stand out immediately after the cruisers, contrary to the original plan. The basis for this decision lay in the fact that the absence of air reconnaisance made it imperative for the forces to maintain concentration, in order that the tactical cooperation of all units might be assured from the start. Toward 1 a. m. (May 31) Helgoland reported wind SW., force 3–5; Borkum, WSW.; List, West, increasing. At 2 a. m. Vice Admiral Hipper left the Jade with his forces. Toward 3.30 a. m. the Scouting Division IV, Squadron III, the fleet flagship, and Squadron I followed, while at the same time Squadron II stood out from the Elbe.

It was rather a peculiar circumstance, but owing to the previously described increased tension of the strategic situation, not accidental, but of necessity, that Admiral Jellicoe was also engaged in making preparations for an undertaking similar to that of the Germans for the latter part of May. Under pressure of public opinion since the bombardment of Lowestoft and the urgent representations from Russian sources, as well as the failure of the previous weak attempts to lure the German fleet as far as possible from their bases in order to bring them to battle against superior forces, the commander in chief of the British fleet had prepared a new plan which in the words of the English semiofficial organ went far beyond anything that had as yet been attempted. (Corbett: Naval Operations, Vol. III, p. 320.) According to this bold plan two squadrons of light cruisers with one battle squadron as support were to appear off Skagen early on the morning of June 2 and proceed through the Kattegat as far as the northern passage of the Great Belt and the sound. In this manner it was hoped to entice the enemy, which had made counter

attacks after every British offensive, to advance to the northward with strong forces. Thereupon he was to be attacked by the other battle squadrons and the battle cruiser fleet which had in the meanwhile taken position for this purpose between Horn Reef and the Great and Little Fisher Banks. In order to prevent the premature discovery of the English fleet in this position, the aircraft tender *Engadine*, accompanied by a light cruiser squadron and destroyers, was to cruise in the vicinity of Horn Reef and by means of aircraft prevent any German airships from approaching the British fleet. In event, however, that the German fleet did not advance far enough to the northward to be brought to battle, it was hoped that considerable damage might be inflicted on it by a new mine field, placed by the mine layer *Abdiel* (in addition to the one laid on the night of May 3–4) to the southward of Vyl Lightship. Furthermore, three of the Harwich submarines were to take position to the northward of this mine field from June 1 to 3 to await favorable opportunities for attack. Two additional submarines of the flotillas stationed at Blyth were to cruise to the eastward of Dogger Bank for the same purpose. This plan, however, was crossed by the German undertaking before it could be developed: thus it came about that Admiral Scheer prescribed the manner of action for the enemy. If the British plan may be designated bold, this must be even more true of the German plan in view of the relative strength of the fleets at the time, especially in the event that the British happened to be at sea at that time. However, it was more in accordance with the German plan that the enemy should be drawn out by the appearance of the cruisers off Skagerrak, and for this reason every effort was made to keep the German preparations as quiet as possible. But in spite of every precaution and the restriction of radio communications, the English were informed on the morning of May 30 that the German High Seas Fleet was assembling in the outer Roads. This fact, together with the puzzling activities of the German submarines in the North Sea, pointed to a new German offensive of extraordinary importance. Accordingly, the British Admiralty sent a warning to Admiral Jellicoe at noon on May 30 that the German fleet would proceed to sea in all probability early the next morning and that already 16 submarines had left port, of which the greater part were cruising in the North Sea. It was believed that for some time past a large-scale operation had been planned on the German side which would shortly be initiated, but aside from this assumption there was no possibility of obtaining an insight into the intentions of the German commander in chief. Final orders could not, therefore, be issued to the fleet, but as a precautionary measure the Harwich destroyers and mine-sweeping gunboats were recalled from

the east coast and all submarines were ordered to hold themselves in readiness. Shortly after 6 p. m. May 30 it became known that all units of the High Seas Fleet had received an important operations signal, viz, "31 May Gg 2490," which could not be fully interpreted but left no doubt that a large-scale operation was immediately pending. There was no time to be lost; therefore, at 6.40 p. m. a telegram was sent by the Admiralty to Admirals Jellicoe and Beatty to assemble their forces in the usual manner at the rendezvous about 100 miles eastward of Aberdeen, and there await further developments. Aside from this they were informed that for the present the Harwich forces as well as those at Nore would be held in reserve until the situation was further developed; that in accordance with the proposed plan to send the fleet in the direction of Skagerrak, three submarines should proceed at once to take station near the outer area of the German Bight to the westward of Vyl Lightship, and that two others should occupy a position to the eastward of the Dogger Bank.

In the opinion of the Admiralty it was not improbable that the expected advance of the German fleet to the northwest, as indicated by the disposition of the submarines, might be only a feint to cover another operation in southern waters. Admiral Bradford [Commanding Third Battle Squadron, see fig. 1] had therefore received orders, after the auxiliary cruisers and patrols had been recalled from the east coast station, to assemble his cruisers at a previously designated position off Swin and the following morning to put to sea from Sheerness with the Third Battle Squadron. At the same time Commodore Tyrwhitt was ordered to hold all available light cruisers and destroyers at Harwich in readiness for immediate action. In this manner all precautions were taken to assure a prompt counter offensive against any undertaking in southern waters.

In the north everything was ready as well, and as early as 11.30 p. m. (May 30–31), or three hours before the German fleet stood out, all divisions of the Grand Fleet were putting to sea in three columns [fig. 2 shows this advance] in order to reach the point of concentration designated. From Scapa Admiral Jellicoe stood out with the First and Fourth Battle Squadrons, Third Battle Cruiser Squadron, Second Cruiser, and Fourth Light Cruiser Squadrons, as well as the Fourth and Tweilth Flotillas and one division of the Eleventh Flotilla; from Cromarty Admiral Jerram, with the Second Battle Squadron, the First Cruiser Squadron, and the nine destroyers of the Eleventh Flotilla with the flotilla leader; and from Rosyth Admiral Beatty, with the First and Second Battle Cruiser Squadrons, the Fifth Battle Squadron, the First, Second, and Third Light Cruiser Squadrons, and 27 destroyers of the Thirteenth, Ninth, and Tenth Flotillas.

In order to facilitate the difficult exit of so large a number of ships at night a comprehensive plan was put into effect somewhat similar to the German scheme. The principal value of this arrangement lay in the fact that only two signals were necessary to put the project in motion. At a preparatory signal consisting of a single word all ships raised steam for 18 knots and within two hours were ready for sea, while the admiral commandant at the Orkney and Shetland Islands notified the patrol forces of the pending departure of the fleet. The second signal indicated the time for weighing anchor of the first squadron, as well as the course to be laid after passing the antisubmarine nets. Everything else, such as the order in which the squadrons should leave the harbor, the choice of exist course to the northward or southward of Pentland Skerries, the squadron and division intervals, and the disposition of destroyer flotillas for submarine screening, was definitely laid down and required no further signal. Finally, to guard against the danger of submarines, the plan provided that from the time of passing Pentland Skerries until daybreak the squadrons were to proceed on three different routes which lay 7 miles apart. Similar arrangements were also made for the forces leaving the Moray Forth and the Firth of Forth. (Jellicoe: "The Grand Fleet," p. 299.)

Chapter 9

SKAGERRAK—FROM DEPARTURE OF THE FLEET TO THE CRUISER ENGAGEMENT

The lively activity of the German submarines in the immediate vicinity of the bases of the Grand Fleet warned the latter to take additional precautionary measures for its departure. For instance, a few hours before Admiral Beatty with his forces left the Forth, a submarine near this base had attacked the *Trident*, the flotilla leader of the Blyth destroyers, another had fired torpedoes at the gunboat *Gentian* near Pentland Skerries during the afternoon, while a third had been sighted near Aberdeen on the same day.

Of the large number of submarines attached to the High Seas Fleet which were at sea, only the *U–67*, *UB–22*, *U–70*, and *U–32* had received the code words announcing the beginning of the German offensive; consequently these were the only boats which on the night of May 31 were ready for the offensive after the long period of futile waiting.

Upon receipt of the radio the *U–32*, which had been assigned the middle sector extending to the eastward of the Firth of Forth, laid a course to arrive at daybreak on May 31 at a point about 80 miles to the eastward of May Island. The commanding officer based his decision on the fact that the English must be aware of the presence of the German submarines in that area and, in case they stood out for a counteroffensive, would, if possible, put to sea during the night in order to pass the danger zone during darkness. If this assumption were correct, and the fleet did stand out in the evening hours, it must enter the area which was patrolled by the *U–32* at daybreak. The correctness of this decision was seen to be proven. At 4.40 a. m. (May 31) two warships were sighted from the Firth of Forth which were made out to be the light cruisers *Attentive* and *Adventure* (in reality *Galatea* and *Phaeton*). Separated by a distance of 600 meters from each other, these vessels approached at 18 to 19 knots so rapidly that with the prevalent conditions of low visibility the *U–32* could only approach to within 900 meters. While making the attempt to attack the leading cruiser with two bow shots and the second with two stern shots, the commanding officer was prevented from this by the fact that after the first shot the periscope jammed in the extended position and betrayed the presence of the submarine. At the second shot the leading cruiser turned away sharply, while the second headed

directly for the submarine. The boat was barely enabled to submerge to 15 meters when the loud noise of the cruiser was heard overhead. As the *U–32* came to 10 meters at 5.10 a. m., two battle cruisers, surrounded by numerous destroyers, were seen on a southeasterly course through the periscope at the limit of visibility, but it was impossible to make an approach for attack. The boat came to the surface immediately, erected the radio masts, and sent off the important radio message reporting the departure of the enemy forces. [Note Y, fig. 2.] Although at the time there was a submarine in the next square, the *U–70*, which received this message, it did not sight any enemy forces.

Meanwhile the *U–66* had received the code word from Brugge announcing the beginning of the German offensive at 2 a. m. while occupying its new station about 60 miles to the eastward of Peterhead. Thereupon the first thought of the commanding officer was to return immediately to the inner part of the sector which had previously been assigned to him near the Firth of Forth. Since he was under the impression that the German offensive would be directed toward Sunderland it seemed highly improbable that the English forces would stand out from the Firth of Forth in a northeasterly direction and thus pass through the zone which had been assigned to him. Further, previous experience had shown that in the event of the fleet standing out, the antisubmarine offensive near the coast would be well organized and that the submarine would be forced to cruise submerged with little chance of seeing anything, owing to the misty weather. For this reason the commanding officer deemed it best to remain in his present position in the hope that the forces from Scapa Flow might pass through his zone en route to Horn Reef. The correctness of this decision was substantiated. At 6 a. m., while about 60 miles to the eastward of Kinnaird Head, there suddenly appeared through a fog bank an armored cruiser, distant 5,000 meters, which was steaming at 20 knots toward the submarine. The latter submerged immediately and prepared the torpedo tubes for a shot. At this moment the cruiser (*Duke of Edinburgh* class) chanced to turn away and soon disappeared in the mist. Shortly after, from the same direction, appeared a small cruiser with four stacks (*Birmingham* class), then a large number of destroyers steaming toward the submarine on line of bearing, while behind these at an interval of 1,000 meters appeared eight large warships in double column. Abandoning the proposed attack on the light cruiser, the *U–66* steamed toward the battleships, but was forced under water at a distance of 300 meters by a destroyer while the squadron passed overhead. The hope of being able to assume position for attack on the rear ship by steaming at right angles to the course of the enemy and passing the antisubmarine

screen could not be realized. When the periscope broke water the battleships had already passed and soon vanished in the distance. The fact that this attempt to take advantage of a brilliant opportunity for attack was unsuccessful must be attributed more to the misty weather than to the effectiveness of the antisubmarine screen. The experiences of the last few days had shown that in order to achieve success the submarines must operate on the surface, and therefore outside the zone of the enemy patrols. Only when they were on the surface could information be exchanged by radio regarding the sighting, position, and course of the enemy sufficient to insure cooperation in the maneuvers for attack.

At 7.35 the *U–66* came to the surface and dispatched a radio reporting the above incident. [Note X, fig. 2.] The objective of the enemy forces was uncertain and to follow them would be useless. Only upon their return would there be a possible opportunity for a renewed attack. It seemed to the commanding officer that the squadron which was sighted, apparently standing out of the Firth of Forth, would hardly return on the reverse course on account of the known danger from submarines, but that it would in all probability stand into Scapa Flow. He was therefore about to approach this latter base on the line from Utsire when the weather suddenly cleared. Since now the possibility of sighting enemy forces seemed considerably greater, he steamed at high speed about 15 miles to the southeast in order to reach a position from 50 to 60 miles eastward of Peterhead by evening.

Of the other boats near the Firth of Forth, the *U–63* had first come to the surface at 5.45 a. m. after passing the rainy and foggy night under water, and at 6.25 and 7.16 a. m. had received the messages from the *U–32* and *U–66* reporting contact with enemy forces. From these it was evident that the enemy had put to sea during the night. It was inferred from intercepted English radio messages regarding the strength and disposition of the patrol forces that further enemy units would stand out or in during the next night. The commanding officer therefore decided to make for Bell Rock and to cruise in that vicinity during the evening and morning hours of May 31 and June 1, on the chance that enemy forces might cross that zone when returning to the Forth after the completion of operations. The departure of the fleet had not been noticed by either this boat or the neighboring boat, the *U–51*, which had been on the surface in its assigned sector close inshore since 4 a. m. Further out to sea the *U–52* had been on the surface in order to charge batteries outside the line of patrols, but like the *U–51* had not been aware of the departure of the enemy fleet. On the other hand the *U–24* (Schneider), which had been close inshore

to the southward of the Firth at daybreak, stood out toward his sector on receipt of the messages from the *U–32* and *U–66*, but was unable to make contact with the enemy. Owing to the increasing wind and sea, the *U–47*, which was stationed near Kinnaird Head close inshore, found it hopeless to attempt to follow the reported warships.

The attempted attack of the *U–66* on the Second Battle Squadron on leaving Cromarty is not mentioned in the English accounts. On the other hand, submarines were reported by the battle cruiser fleet standing out of the Firth of Forth on the occasion of the attack at 4.50 a. m. by the *U–32* on the light cruiser *Galatea*, which was on the left flank of the antisubmarine screen. While the first torpedo broke the surface immediately ahead of the *Galatea* the second passed close astern. Another submarine was reported by the cruiser *Yarmouth*, which the *Lion*, the flagship of Admiral Beatty, also reported dead ahead. This vessel, together with the other battle cruisers turned eight points to port, returning to the original course 20 minutes later; but before this could be effected the *Turbulent*, one of the destroyers of the screen, sighted a third submarine, which, however, was unable to make an attack. The principal submarine danger zone appeared then to have been passed. The disposition of submarines close to the enemy bases, on which such hopes had been placed by the Germans for damage to the enemy forces before the battle, proved of no avail. Furthermore, even in the service of information, the short range of visibility and their low speed had proven the submarines to be inadequate for this mission, so that the commander in chief could not even be informed of the fact that the main body of the Grand Fleet had put to sea. When at 6.37 a. m. the report of the *U–32* was received on the fleet flagship that two battleships, two cruisers, and a number of destroyers had been sighted standing out from the Firth of Forth on course SE., and this message was followed an hour later by the important report of the *U–66* that eight battleships, light cruisers, and destroyers were 60 miles eastward of Peterhead, the commander in chief at first inclined to believe that, then as in the past, the enemy had received warning of the departure of the High Seas Fleet. Opposed to this assumption was the fact that the time interval between the report of the departure of the fleet and the sighting of enemy forces was too short, and the strength of the units and the divergent courses of the detachments reported indicated that a connection between the known movements of the enemy and the German offensive was highly improbable. This conclusion was not influenced by the fact that shortly before the receipt of the message from the *U–66* the principal decoding station at Neumunster reported English intercepted radio messages showing that two battleships or battleship squadrons with accompanying de-

stroyers had left Scapa Flow. This message gave no insight into the enemy intentions. Neither tactical cooperation of the reported detachments, nor an offensive with the German Bight as objective, nor any connection with the pending German operations could be inferred from this information. The reports therefore did not influence the prescribed procedure, but only served to arouse the hope that it would be possible to bring a portion of the enemy fleet to battle.

Even on the English side, there was great uncertainty during the forenoon of May 31 as to the extent of the German operations. Apparently the English submarines on station near the German Bight had less opportunity than the German submarines near the English harbors to obtain information of value. Even the usual observation of the German radio traffic, which in the past had furnished the English with much of their available information, was denied them at this time on account of the special precautions which were exercised. The fact that at the beginning of the operations the fleet flagship *Friedrich der Grosse* had exchanged radio calls with *Entrance III* station ship at Wilhelmshaven did not betray to the enemy that the fleet flagship, and therefore the German fleet, was standing out.

Even toward noon the English radiocompass stations believed the German fleet to be still in the Jade. Although he was being continually informed by the Admiralty as to the developments, Admiral Jellicoe had no reason to surmise that a battle was pending, but rather supposed from the information received that one of the usual cruiser raids was in progress and that the High Seas Fleet would put to sea considerably later to support the returning cruisers. It did not occur to him that since the appointment of Admiral Scheer as commander in chief every German offensive would be planned with the idea of deliberately seeking battle. [This is somewhat different than the previous statement of Admiral Scheer that he did not intend to seek out the concentrated enemy fleet for the purpose of a fight to a decision and did not desire the enemy to force such a fight upon him.] This underestimation of the enemy, coupled with the previous operation against Lowestoft, resulted in a deployment of forces which was carried too far. He himself contemplated a concentration with Admiral Jerram's forces, which at 9.30 p. m. stood out from Cromarty, to take station about 90 miles to westward of the Norwegian coast on the line Lindesnes-Peterhead, while Admiral Beatty had orders to be with the battle cruisers and the 5th Battle Squadron at a point about 70 miles to the south-southeastward of the main body and about 110 miles to the westward of the Jutland coast in the area of the Great Fisher Bank. Only

then should the two forces approach each other to within visual signal distance, the battle fleet steaming to southward and the battle cruiser fleet to the northward. To fulfill the primary mission of drawing the enemy toward the fleet, the distance between battle cruiser fleet and the main body was too great.

Since all developments in the past had shown that in the North Sea area a battle was hardly to be expected, the English had in the course of time come to consider that the primary mission of the battle cruiser fleet was not close tactical cooperation with the battle fleet but rather a means of defense against German raids on the southeast coast, while the battle fleet itself was to be held back far enough to prevent the enemy from making an unopposed attack on the Tenth Cruiser Squadron, and thus rolling up the northern blockade line. An interval of 50 miles between the detachments of the Grand Fleet seemed to be the minimum to carry out these requirements. Thus the disposition of forces which Admiral Jellicoe chose in this instance was one which careful study and long experience had shown to be advantageous and which was always resorted to in case the enemy was known to be initiating an offensive with unknown objective. Only in the case of their own offensive operations was this procedure departed from and then the interval was reduced to about 40 miles. (Corbett: Naval Operations, vol. 3, p. 325.) This strategic disposition of forces would not have proven faulty in this particular case had not Admiral Scheer altered his original plan in the last minute, owing to the failure of air reconnaissance, and decided to put out with the main body immediately after the cruisers, a decision which, in the light of subsequent events, proved of the greatest advantage in bringing about the German victory in the cruiser engagement.

The route to the westward of Amrum Bank, passing through the enemy mine fields, had been cleared by the mine-sweeping formation and the fleet was led safely through to the open sea. Toward 8 a. m. Scouting Divisions I and II had reached a position about 35 miles west of Lister Deep. At about 10 a. m. the battle squadrons also stood to the northward of the English mine fields, headed then to the NW., passing Horn Reef lightship 35 miles abeam, and, following the route taken by the battle cruisers two hours earlier, laid course for the Little Fisher Bank, near the southern exit from Skagerrak. The commander in chief had ordered that in the event of the weather improving five airships were to ascend on May 31 or June 1, one to scout over the Skagerrak and one over the Hoofden, while the other three were to cover the sectors to the north and west, 280 to 200 miles from Helgoland. [See fig. 6 for position of airships at 3 p. m.] Therefore the commander of the airship detachment,

Commander Strasser, gave orders for those ships, which were assigned to the northern zone, to ascend at 2 a. m., while the two assigned to the southern area were to follow at 6 and 8 a. m. The unfavorable weather conditions, however, did not permit the carrying out of these orders until late in the forenoon. Two of the ships, *L–11* and *L–17*, were not able to clear their fixed hangers on account of cross winds at that time. In place of these, two airships from the rotating hangars at Nordholz, the *L–21* and the *L–23*, were substituted, so that at 12.30 p. m. all five ships were in the air. *L–14* headed toward the Skagerrak, *L–23* toward a point 240 miles to the eastward of Noss Head (Pentland Firth), *L–21* toward a point 120 miles eastward of Peterhead (Moray Firth), *L–9* to a point 100 miles eastward of Sunderland, and *L–16* to a point 80 miles to the eastward of Flamborough Head (Humber). Arrived at these points, the ships were to proceed to the southward on the line through these points, and passing from point to point, form a scouting line between the second and fourth meridians to protect the fleet against a flank attack from the English coast. Shortly after ascending, however, it was realized that, owing to the misty weather and the low-lying clouds at 300 meters, the airships could only obtain a very restricted field of vision.

Meanwhile the High Seas Fleet was proceeding in formation according to plan. The fleet steamed in single column, in the following order: Squadron III, fleet flagship, Squadron I, and Squadron II. [Fig. 4–A.] All detachments were up to strength with the exception of Squadron III, in which the *Konig Albert* was missing, having to remain in dock on account of condenser trouble which could not be neglected. Disposed in a circle around the fleet at distances of from 5 to 8 miles were the light cruisers, *Stettin*, *Munchen*, *Frauenlob*, *Stuttgart*, *Hamburg*, and *Rostock*, each accompanied by 1 destroyer, while 26 other destroyers formed the antisubmarine screen for the fleet. [Fig. 4–A should be corrected as follows: *Stettin* and *V–48* were directly ahead of Battle Squadron III. *Rostock* and *S–53* were on port beam of Battle Squadron III. *Munchen* and *S–54* were on starboard beam of Battle Squadron III. *Hamburg* and *V–73* were on port beam of Battle Squadron II. *Frauenlob* and *G–42* were on starboard beam of Battle Squadron II. The screen for Battle Squadron III was composed of the First, Fifth, and Ninth Half Flotillas. The screen for Battle Squadron I was composed of the Tenth and Fourteenth Half Flotillas. The screen for Battle Squadron II was composed of the Thirteenth and Fourteenth Half Flotillas.] About 50 miles ahead were the 5 battle cruisers with Destroyer Flotilla IX disposed as antisubmarine screen, while about 8 miles ahead of

these Scouting Group II was disposed in a quarter circle on scouting line from the northwest to the northeast. [Fig. 5–A. There were three destroyers with the *Elbing*—*B–109*, *B–110*, *B–111*.] To these was added the flagship of the second leader of destroyers. Dead ahead was the light cruiser *Frankfurt* with 5 boats of the Twelfth Half Flotilla, to starboard the light cruiser *Wiesbaden* with 4 boats of the Eleventh Half Flotilla, and *Regensburg* with 2 boats each of the Third and Fourth Half Flotillas, to port the light cruiser *Pillau* with 3 boats of the Third Half Flotilla, and *Elbing* with 3 boats of the Fourth Half Flotilla. At 3 p. m. [the times used in this account are one hour greater than G. M. T., which is used in all British accounts and in the figures accompanying this translation. Thus 3 p. m. German time is 2 p. m. G. M. T.] the leading ship of the Squadron III stood 55 miles to the westward of Lyngvig, while the leading ship of the battle cruisers was 65 miles to the west of Lodbjerg.

In the same latitude, and almost perpendicular to the course of the Scouting Division II, the British battle cruiser fleet was approaching, at the head in double column the First and Second Battle Cruiser Squadrons, and 5 miles astern the Fifth Battle Squadron, while the ships of the First, Second, and Third Light Cruiser Squadrons were on a scouting line on a sector bearing SE. about 8 miles ahead of the capital ships. [Figs. 3 and 5.] Had Admiral Beatty held this course he would have passed about 40 miles astern of the German battle cruisers and 20 miles ahead of the main body at about 5.30 p. m. The mission of the German offensive, to cut off and bring to action part of the enemy fleet before the entire strength of the British fleet could be brought to bear, would in this manner very probably have been accomplished. Inasmuch as the British battle cruiser fleet had received orders, in the absence of any developments, after reaching the assigned position at 3 p. m., to swing off to the northward to effect a junction with the Grand Fleet, the situation developed in a different manner. As early as 2.30 p. m., Admiral Beatty, who was leading his forces in his flagship *Lion* at the head of the First Battle Cruiser Squadron, changed the disposition of the light cruisers, shifting the line of bearing to ENE.-WSW., with the center of the scouting line bearing SSE. from the *Lion*, so that the light cruisers in the proposed advance to the northward would form a screen between his own squadrons and the probable line of approach of the enemy forces. At the same time he altered the formation of his squadrons, so that the Second Battle Cruiser Squadron was in position 3 miles ENE. of *Lion*, and the Fifth Battle Squadron 5 miles NNW. of the First Battle Cruiser Squadron, in order that, after the change of course to the northward had been effected, one squadron would be on each flank of the *Lion*. This maneuver de

layed the advance to the eastward, but at 3 p. m., when the British cruiser commander estimated his position about 10 miles from the point he was due to reach at 3 p. m. (in reality he was 5 miles still farther to the NW.), signal was made for all units of the Battle Cruiser Fleet to change course to north at 3.15. At that time the First Battle Cruiser Squadron was 45 miles to the westward of the German battle cruisers, while between the eastern flank of the British forces and the western flank of the German forces there was only about 16 miles of open water. Although with the convergent courses which the German and British forces were steering contact would certainly be made sooner or later, it was distinctly to the advantage of the latter that this should occur as late as possible. The longer contact could be delayed the closer the forces of Admiral Jellicoe and Admiral Beatty would be to each other, and therefore the more unfavorable would be the situation for the Germans. It was therefore a lucky accident for the German fleet that shortly after the change of course to the northward a very trivial circumstance served to bring about an early contact of the forces.

At about 3 o'clock aboard the *Elbing*, Commander Madlung, which was on the extreme left flank on the scouting line, the Danish freighter *U. Fjord* was sighted to the westward, and the *B–109*, the flotilla leader of the Fourth Half Flotilla (Commander Adolf Pitmar), together with the *B–110* (Lieutenant Commander Vollheim), was sent to board and search the vessel. At practically the same moment this steamer was sighted also by the *Galatea* and *Phaeton*, the light cruisers on the right wing of the British scouting line, bearing about ESE. distant 12 miles. [*Galatea* was the flagship of the First Light Cruiser Squadron in fig. 8.] As it happened the freighter had stopped and was blowing off steam. While all other vessels of the battle cruiser squadrons swung to the northward at 3.15 p. m., the commander of the First Light Cruiser Squadron (Commodore A. Sinclair) aboard the *Galatea* headed toward the Danish steamer with his two ships, followed shortly by the *Inconstant* and *Cordelia*, and soon thereafter made out the stacks and masts of one, and then two, warships. At first these large boats of Flotilla II which were in the vicinity of the Danish steamer were erroneously held to be cruisers, and approaching closer the British vessels took up the chase, reporting at 3.20 by radio, "Enemy in sight." Eight minutes later these boats were recognized as destroyers and taken under fire by the *Galatea* and *Phaeton*. At that great range the *B–109* and *B–100*, which were soon straddled by numerous shots, could not return the fire. Soon, however, help appeared from the northeast, since the *Elbing* had sighted smoke in the direction reported by searchlight signal and was steaming toward it at full speed. The craft which she sighted under the smoke clouds

appeared at first to be battle cruisers on account of their high bow, and were reported by radio as such at 3.27; only after the enemy had turned to the northward to engage the *Elbing* in a running fight were they recognized as light cruisers. Then the *B–109* reported by radio, "Scattered enemy forces in 164 y IV" (about 90 miles to the westward of Bovbjerg). Shortly thereafter the *Elbing*, being under fire herself, opened on the enemy at ranges of from 13,000 to 14,000 meters, and in spite of the relative speed of the vessels on opposite courses was soon able to obtain a hit on the *Galatea*, the first hit of the Skagerrak battle. The shot struck under the bridge, penetrated two decks, but unfortunately did not explode.

At 3.39, after the first straddling salvo, the *Galatea* turned away, followed by the other vessels of the First Light Cruiser Squadron, *Cordelia* and *Inconstant*, and was apparently attempting to draw the German ships away to the northwest. In this manner Commodore Sinclair was carrying out the idea of making it possible for the British battle cruiser fleet, which he knew at the time of his advance to be about 20 miles WSW. of the *Galatea*, to cut off from the southward the increased number of enemy light cruisers and destroyers which he had meanwhile sighted to the northeastward, as well as a large smoke cloud "as from a fleet" in the north-northeast. By this act he renounced from the start any possibility of obtaining further information regarding the enemy. Not satisfied with this, the Third Light Cruiser Squadron joined this maneuver, after its commander, Rear Admiral T. D. W. Napier, had ordered the aircraft tender *Engadine* to seek cover with the battle cruisers. The *Elbing*, on the other hand, turned to follow the enemy on the course which they had set, but was cautious enough after a few minutes to bear off to the northward, so that from 3.48 to 4.07 the *Galatea* and *Phaeton* could only be kept under fire at intervals at extreme range, while the other English cruisers to the westward held out of range. Simultaneously, the *Frankfurt* and *Pillau* closed in on the *Elbing* from the eastward in about the same latitude.

Aboard the *Frankfurt*, the flagship of the commander, Scouting Division II, Rear Admiral Boedicker, as well as aboard the *Lutzow*, the report of contact with enemy forces made by the *Elbing* by searchlight, at 3.30 p. m., had been misread and was understood to mean that the latter had sighted an enemy fleet of from 24 to 26 battleships. Upon receipt of this message Admiral Boedicker had immediately abandoned scouting operations to the northward, since the horizon was very clear in that direction, and, calling all other vessels of the scouting line, stood to the westward at full speed. In passing the *Pillau* joined him, and at 3.40 p. m. a radio was received from the *Elbing* reporting enemy battle cruisers 105 miles to the

westward of Hanstholm. Thereupon Rear Admiral Boedicker, with the *Frankfurt* (Capt. Thilo von Trotha) and the *Pillau* (Commander Mommsen) increased speed to 26 knots and changed course in this direction. Ten minutes later, while a number of torpedoes were running toward the German cruisers [the British do not mention firing torpedoes at this time], five cruisers of the *Caroline* class, in separate groups were sighted beyond the *Elbing* on a northerly course, but no battle cruisers were seen. Doubtless it was a case of an error or mistake in the radio from the *Elbing*, and this was shortly corrected by a further radio message from that vessel. While the *Elbing* led the German forces, eight enemy cruisers were gradually made out, and at 4.17 p. m. both *Frankfurt* and *Pillau* opened fire on the leading enemy ships. [Fig. 9. Instead of Scouting Division II being assembled, only *Frankfurt* and *Pillau* were concentrated. *Elbing* was about 2 miles ahead and *Wiesbaden* about 4 miles in rear. The *Regensburg* was about 2 miles on the starboard beam of Scouting Division I. The British light cruisers were also somewhat differently disposed.] Since, however, several of the enemy sheered out, the range became too great and fire ceased, although the German cruisers were steaming at full speed after them.

The movement of the *Elbing*, and later the *Frankfurt* and *Pillau* was followed soon by Scouting Division I. Upon receipt of the first message from the *Elbing*, that smoke had been sighted bearing southwest, Admiral Hipper, at 3.27 p. m., advanced on course WSW. with ships disposed at wide intervals, accompanied by the light cruisers *Wiesbaden* and *Regensburg*, which had closed in from the right wing of the scouting line. Soon thereafter, while under the impression that the *Elbing* had reported the enemy fleet of from 24 to 26 battleships, due to a mistake in the signals, he brought his ships in column on course SSW., since the ring of splashes around the *Elbing* appeared to indicate the prospect of an immediate action on that bearing.

The further reports of the *Elbing* and the commander of Scouting Division II led to the conclusion that the enemy forces consisted only of four light cruisers of the *Calliope* class, which were being pursued to the northward by the *Elbing*, *Frankfurt*, and *Pillau*. Therefore, at 3.45 p. m. [shown at 2.48 in fig. 7. The courses in the text are magnetic, while in the figures true north is at the top of the sheet. Variation is 14° east], Admiral Hipper changed direction to the westward, at 3.50 [this is 2.52 in fig. 7] changed course again to WNW., nine minutes later formed column on course NNW., and at 4.10 p. m. following the light cruisers at 23 knots to the northwest [this is shown at 3.12 in fig. 9]. With this maneuver he unwittingly followed the tactics desired by Admiral Beatty. This officer had

perceived from the reports of the *Galatea* that the enemy forces did not consist of a few individual units, but comprised a strong fleet. He decided, therefore, to abandon the original plan of operations in the face of these new developments and, if possible, to cut off the retreat of these reported enemy forces. Scarcely had Admiral Hipper turned to course WSW. when Admiral Beatty changed course to SSE. with the First and Second Battle Cruiser Squadrons [at 2.35 in figs. 7 and 8], a maneuver which was followed only some few minutes later by the Fifth Battle Squadron, on account of the signal being difficult to make out. This short delay was sufficient, however, to increase the interval between the latter and the battle cruisers to about 10 miles, since they were steaming at 22 knots [This opening out of the Fifth Battle Squadron is not shown in fig. 8.] At 3.35 p. m., when the *Galatea* reported heavy smoke clouds bearing ENE. " as from a fleet," Admiral Beatty was induced to dispatch the destroyers *Onslow* and *Moresby* to the aircraft tender *Engadine*, which was in the vicinity, to order out a seaplane for reconnaissance in that direction. Twenty minutes elapsed before the plane could be launched and had taken off. On the other hand, at 3.51 the *Galatea* reported that aside from destroyers and light cruisers the smoke sighted came from about seven large ships. [See arrow at 2.51 from First Light Cruiser Squadron in fig. 8.] From their bearing, position, and the fact that this force maintained a northerly course, Admiral Beatty believed that he had advanced sufficiently far to the southward to cut off this detachment before they could reach Horn Reef. He therefore eased off gradually to port with the ships in three columns until the course was east at about 4 p. m., ready to proceed at full speed at any instant. As a matter of fact, the German battle cruisers were directly approaching him at that time on course WSW. The distance between these forces was still about 29 miles when the Germans, still outside the range of visibility of the English, changed course to NW. at right angles to the latter, drawing away to follow the light cruisers *Elbing*, *Frankfurt*, and *Pillau*. After Admiral Beatty had failed to sight the enemy on course east and a further message from the *Galatea* reported that the enemy was being drawn to the northwest behind the First and Third Light Cruiser Squadrons, he altered course to NE. and increased speed to 24 knots. [At 3.12 in fig. 9.] At this time the Fifth Battle Squadron bore WNW. distant 7 miles, the Second Battle Cruiser Squadron NNE. distant 3 miles from the First Battle Cruiser Squadron, while the *Nottingham* and *Dublin* of the Second Light Cruiser Squadron steamed to starboard opposite the Second Battle Cruiser Squadron and the *Southhampton* and *Birmingham* followed about 5 miles astern. At 4.20 two rapidly approaching columns of large warships were sighted bearing WSW.,

and at 4.22 the *Seydlitz* made out two battle cruisers (Second Battle Cruiser Squadron), distinguished by the tripod masts, distant about 15 miles.

One minute later the *Princess Royal* made out smoke to the east by north, but not until 4.25 did the other British ships sight the smoke columns, which were later distinguished as masts and stacks bearing ENE. Whether the British ships stood out better against the clear background of the western horizon, or the German range finders and glasses were better, or whether the light gray painting of the German ships was more favorable need not be argued. At any rate, the British were sighted earlier than the Germans, though some time elapsed before the German forces could observe further details as to course, speed, and formation of the enemy which was in sight. It could only be roughly determined that their force, among which appeared to be six large warships, was steering a northerly course, and this fact was decisive in the selection of the battle course. Not being inclined to avoid this opportunity for battle, as contemplated in the original operations plan, Admiral Hipper decided to accept battle on this unfavorable course, even though in so doing he would be drawn away from his own fleet. He therefore held his course, following Scouting Division II, and ordered fire distribution from the right, read at any moment to make signal to open fire. At 4.29 no change of course on the part of the enemy could be discerned. [It should be especially noted that Hipper did not sight the Fifth Battle Squadron at this time. This squadron is erroneously placed in fig. 9 and should be much more to the westward. Many critics of Beatty have argued that he should have brought the Fifth Battle Squadron into action simultaneously with the battle cruisers. But had Hipper sighted 10 British ships it is certain that he would have turned to the southward toward Scheer and avoided action. It therefore was fortunate for the British that Hipper saw only six enemy capital ships.]

Meanwhile Admiral Beatty had been enabled to confirm the bearing of the enemy forces, and finding that in trying to accomplish his purpose of cutting them off from their base he had advanced too far to the northward, changed course back to east and sounded "Clear ship for action." At 4.33 he ordered the Second Light Cruiser Squadron to take station ahead with the Ninth and Thirteenth Flotillas, while the Second Battle Cruiser Squadron swung in behind the First on course ESE. to form line of battle. [Note A, fig. 10.] At the same time the Fifth Battle Squadron, which was then bearing WNW., distant 8 miles, was ordered by signal to advance to the eastward at full speed. Visibility was good, the sun at their backs, and the wind WNW. If Admiral Hipper held his course the British battle cruisers would stand between him and his base,

Whether the enemy was supported or not, Admiral Beatty's mission was to bring ships of the same class to battle and to maintain contact with these as long as he was not obviously inferior in numbers. In this case, however, he had a measurable superiority, his position appearing so favorable both tactically and strategically that he could not be in doubt as to the correctness of his decision.

On the German side the movement of the Second Battle Cruiser Squadron observed at 4.33 aroused the somewhat mistaken impression that the enemy was changing from column formation to deploy on battle line to the southward; therefore Admiral Hipper swung off to starboard and went on course southeast. This new movement of the enemy was followed all the more willingly, since on this course was offered the possibility of drawing the enemy forces toward his own main body. At the same time he reduced speed from 23 to 18 knots in order to give the three vessels of Scouting Division II opportunity to close up. The latter had sighted the aproaching enemy seaplane a few minutes earlier. This plane had been forced to remain at a low altitude on account of the low-lying cloud banks and was, therefore, taken under fire at ranges of from 4,000 to 5,000 meters. Admiral Boedicker was about to send a detachment of destroyers to investigate a steamer which was in sight having the appearance of an aircraft tender when Admiral Hipper ordered the light cruisers to assemble on Scouting Division I. These vessels thereupon put about, and this maneuver was the only fact of importance which the airplane was able to observe and report by radio. In attempting to carry out further reconnaissance the motor failed and the plane was forced to land on the water; was hoisted in a quarter of an hour later.

Meanwhile on the German and British battle cruisers all range finders and telescopes were directed on each other. According to observations on the *Lutzow* the enemy appeared to be standing on a southerly course at 4.35 p. m., three *Lions* leading, then *Tiger* and two *Indefatigables*, while at a great distance astern and barely visible were four or five *Queen Elizabeths*, while a large number of light cruisers and destroyers were seen steaming to the southward. All hands were at battle stations and awaited with expectancy the signal to open fire.

At 4.44 p. m. the German ships were clearly recognized as to their class by the *Lion*, and it was believed that the following ships stood before them, viz: *Hinderburg*, *Lutzow*, *Derfflinger*, *Seydlitz*, and *Moltke*. It was a momentous event, which no one who had experienced it could ever forget, when, after a breathless approach, the British and German battle cruisers, the most beautiful ships of each fleet, stood aligned with majestic confidence "like fate itself," and swinging into battle line let loose the first thunder of

gunfire which followed the preceding quiet and concentration of forces.

Once before, in fact, these same ships had taken the measure of each other in battle, on January 24, 1915, but this time the situation was entirely different. At that time the contact occurred when all preparations had not been completed on the German side nor had provision been made to support the battle cruisers. This time the meeting was sought by the Germans, and the full strength of the German fleet was ready to prevent them from falling a victim to superior forces. In the erroneous assumption that the High Seas Fleet had not left the Jade up to noon, and without sufficient reconnaissance ahead of him despite the large number of his light forces, Admiral Beatty believed that this time he could achieve what had previously been impossible; namely, to cut off the battle cruisers from their base and with 10 ships opposed to 5 to inflict a decisive defeat. Victory appeared to him to be certain as he altered course of the battle line toward Horn Reef—he did not know what this decision was to cost him.

Admiral Jellicoe also believed the German Fleet to be still in the Jade when, at 3.20 p. m., on the *Iron Duke*, at a point about 65 miles to the north-northwestward of the position in which the German ships were sighted, he received the report of the *Galatea*. At 3 o'clock, according to the fix obtained on the *Iron Duke* he was still about 19.5 miles behind the position he intended to reach at that time on account of the delays occasioned by the usual searching of merchantmen and fishing vessels. An increase of speed over the cruising speed of 15 knots did not appear possible if the destroyers were to retain sufficient fuel to accompany the fleet for two days longer as planned. The impression made on Admiral Jellicoe on receipt of the first signal, since only enemy light cruisers and destroyers were mentioned, was that the German forces, finding themselves opposed to superior forces, could find no other way to escape the danger of being cut off from Horn Reef than by going through the Skagerrak. In that case the Third Battle Cruiser Squadron, which, at that time, was in the formation about 20 miles ahead of the Grand Fleet and close to the entrance of the Skagerrak (about 50 miles WSW. of Lindesnes), was in a very favorable position to block this attempt. [Figs. 3 and 4.] Therefore he delayed dispatching the Third Battle Cruiser Squadron to join the battle cruiser fleet as originally planned, and, further, he saw no reason for altering the present course of the fleet. He then ordered all vessels to raise steam in all boilers and kept on the same base course at the same speed continuing to zigzag. On receipt of the message from the *Galatea* at 3.43 that large clouds of smoke "as of a fleet" had been sighted to the east-

northeastward of the position of that vessel, about 95 miles to the westward of Lodbjerg. Admiral Jellicoe discontinued the zigzag course being steered to avoid submarine attack, and advanced at 17 knots on course SE. by E. Twelve minutes later (3.55) he increased speed to 18 knots, ordered his ships to expedite raising steam in all boilers by every means, and to make all final preparations in clearing ship for action. At 4.02 he swung all columns toward Horn Reef on course SE. by S. and ordered the advanced cruiser screen to increase the interval to 16 miles. A few minutes later he received the 3.31 p. m. position of the *Elbing* and the *B-109*, from the Admiralty. [Notes Z and Y, fig. 7.] This had been obtained by means of the radio compass stations—a distinct strategic advantage, which the German commander in chief did not possess. Only when Admiral Jellicoe received by radio the position of Admiral Beatty at 4.15 p. m. did he realize that according to the D. R. positions of the *Iron Duke* and the *Lion* these two flagships were separated by 71 miles. (It developed later that there were errors in navigation in the determination of these positions.) Thereupon he increased speed to 19 knots. At that time there was no cause for apprehension over the great interval between these forces, since according to reports, Admiral Beatty was then on course NE. at 23 knots, while the *Galatea* reported the enemy following the First Light Cruiser Squadron in a northwesterly direction. From this the estimate of the situation showed that the enemy forces consisting of light cruisers and destroyers were being pursued to the northward by the battle cruiser fleet. In that case the enemy must meet the advanced cruiser screen of the fleet at about 5 p. m. Therefore all flag officers received orders to inform the divisions under their command of the situation, and in particular Commodore Hawksley, the commodore of the flotillas, was warned to prepare to sight enemy forces within a very short time.

Scarcely was this flag signal hauled down when further reports showed the situation in an entirely different light. At 4.40 p. m. an urgent radio from the *Lion* reported the sighting of five enemy battle cruisers and a large number of destroyers: a second message designated their course as S. 55° E., while a third stated that Admiral Beatty was engaged in battle. All hope of being able to attack with the battle fleet in a short time was shattered. It appeared now that instead of the general engagement which was sought this action was to be a repetition of the previous vain attempts to chase the enemy battle cruisers. The previous precautionary policy of holding back the fleet to await developments was now at an end as a result of these last reports. At 5 p. m. he increased the speed of all squadrons

to 20 knots, changed formation to column open order to increase speed over the ground, and directed the Third Battle Cruiser Squadron, under Rear Admiral the Hon. H. S. Hood, to rejoin the battle cruiser fleet at full speed to support the latter.

At 4.15 p. m. Admiral Hood, with the battle cruisers *Invincible*, *Inflexible*, *Indomitable*, and the light cruisers *Chester* and *Canterbury*, accompanied by the destroyers *Christopher*, *Ophelia*, *Shark*, and *Acanta*, had, on his own initiative, increased speed to 22 knots and changed course to the eastward upon receipt of the first message from the *Galatea* that the enemy light cruisers were being pursued to the northward in the hope of cutting them off. On the further report that enemy forces had changed course to the southward, he had gone on course S. 26° E., when the welcome order to join forces with Admiral Beatty was received. Admiral Hood's forces were at that time about 25 miles ahead on the port side of the *Iron Duke*, and about 43 miles to the N. by E. of the *Lion*, the flagship of the First Battle Cruiser Squadron [the *Lion* was flagship of the battle cruiser fleet; *Princess Royal* was flagship of the First Battle Cruiser Squadron], according to the 4.50 p. m., reported positions. Since the *Lion*, according to the last reports, was on course S. 55° E., Admiral Hood expected to make contact quickest on course SSE., and therefore at 5.12 stood on this course at a speed of 25 knots. The possibility of overhauling the faster vessels of the First and Second Battle Cruiser Squadrons if they maintained a southerly course was extremely small. Later it was to be shown what an unexpected effect was to result from this advance of the Third Battle Cruiser Squadron.

After the detachment of the Third Battle Cruiser Squadron there followed half an hour of expectant waiting on the part of Admiral Jellicoe, since the commander in chief received no reports of what was transpiring in the meantime with the battle cruiser fleet. In particular he was without information regarding the Fifth Battle Squadron. When, at 5.17 p. m. he inquired of the commander of that squadron, Rear Admiral Evan-Thomas, if he were with Admiral Beatty's forces, he received the laconic reply, "Yes; I am engaged with enemy." There appeared, however, to be no immediate cause for anxiety; on the contrary, Admiral Jellicoe at the time had the greatest confidence that "under the determined leadership of Admiral Sir David Beatty, with a force of six battle cruisers and four of the best and fastest battleships, it was certain that the five German ships would suffer severe injury so long as it was possible to hold them within range." (Jellicoe: The Grand Fleet, p. 329.) "In particular the vessels of the Fifth Battle Squadron were superior to the German ships in fighting

strength, while even the slowest vessel of that squadron possessed sufficient speed to enable it to avoid superior forces." Much greater apprehension was caused the commander in chief by the fact that the deployment of all his forces to the southward would leave the exits of the Skagerrak and the northern waters between Scotland and Norway free to the enemy blockade runners, auxiliary cruisers, and mine layers which might be at sea and afford them an easy access to the Atlantic Ocean. In order to prevent this, he ordered, at 5.38 p. m., the commander of the Tenth Cruiser Squadron, Admiral Tupper, to reestablish the blockade lines to the Norwegian coast which had been withdrawn to the westward on account of the German submarine activities. At 5.50, as a result of the reports from Admiral Beatty, Admiral Jellicoe sent to the Admiralty the important message that a battle was imminent. Thereupon all docks and harbors along the coast were placed in readiness. Tugs, pumping vessels, and other auxiliary vessels raised steam to be in readiness to render aid to damaged ships of the Grand Fleet without delay. Nowhere was the tension greater than in the squadrons and flotillas which were left behind in port when the radio reports with the red bands indicating urgency showed that important events were transpiring at sea. The Harwich Force under Commodore Tyrwhitt suffered especially, since it had been repeatedly stated that in the event of battle they should immediately seek junction with the Grand Fleet. An urgent request for orders from the Admiralty remained unanswered. On the other hand, toward 6 p. m. Commodore Tyrwhitt received a radio from Admiral Bradford stating that the latter with the Third Battle Squadron and the Third Cruiser Squadron under his command, had decided to leave his station near the Swim to proceed to Black Deep Lightship. Thereupon the commander of the Harwich Force could no longer be held back. He could still reach the frequently patrolled area near Horn Reef with his cruisers and flotillas in sufficient time to be in position to attack the retiring German forces during the night. At 6.15 he therefore notified the Admiralty that he was putting to sea, but at the same moment received orders from the latter to continue fueling his vessels, since he might be required later to relieve the light cruisers and destroyers attached to the battle cruiser fleet. The commodore saw in this order only an answer to his first request. He decided to await the results of his report that he was at sea and proceeded to stand out. Twenty minutes later he was in receipt of the following orders: "Return immediately and await orders." (Corbett: Naval Operation, Vol. III, p. 350.)

The reason for this lay in the fact that in the Admiralty there was always the fear that the German offensive to the northward

or to the northwest might be simply a maneuver carried out as a diversion to cloak a large-scale offensive in the channel, and they could not risk leaving the easterly exits of the channel entirely devoid of warships in the interest of a fleet action. In any event they decided to await further developments before reaching a final decision.

On the German side the full available strength of the fleet was employed in this offensive without regard for the protection of the German Bight in the meantime. Thus there were no reserves of any importance left in the harbors. Of the 11 airships which were ready for service at the time, 6 remained in their hangars, as Commander Strasser, the commander airship detachment, deemed it advisable, in accordance with the existing operation orders, to hold these vessels in reserve for the action on the second day, especially since weather conditions were unfavorable. Even those ships which had put out were delayed 12 hours on that account, so that on the occasion of the first contact between the German and British forces none of these airships had passed the line between Terschelling and Horn Reef. It is impossible to estimate the influence on the trend of events had the *L–23* and the *L–14*, especially, been able to reach the area which had been assigned to them in the vicinity of the Skagerrak at the time designated. It was only to be hoped that the airships would even then make contact with the enemy forces. Practically all the airships had received relayed radio messages regarding the action of Scouting Division II, as well as the course and position of the German and British battle cruisers. *L–21*, Lieutenant Commander of Reserve Dietrich, which was assigned the scouting area over the northeasterly part of the Dogger Bank, did not deviate from this mission to protect the NW. flank of the fleet as a result of these messages, since the *L–23* and the *L–14* to the eastward of his position were considerably closer to the scene of activity, while the *L–9*, Lieutenant Commander Stelling, had abandoned the scouting zone to the westward on account of engine trouble and returned to the hangar. On the other hand, the *L–23*, Lieutenant Schubert, which was closest to the scene of the reported action, left Horn Reef at 5 p. m. to reach that area. When the commanding officer learned from later messages that Admiral Hipper was opposed by superior forces, he decided to alter this plan and take over the protection of the northern flank of the battle cruisers in place of the *L–14*, which was known to be far astern. He was further confirmed in this decision when upon receipt of a message at 5.50 p. m. from the *L–14*, Lieutenant Commander of Reserve Bocker, he learned that that ship was then at a point 15 miles to the northward of Horn Reef and was laying course toward the reported enemy forces. Shortly thereafter the *L–14* appeared

far astern to starboard, while the *L–23*, which was then about 45 miles to the westward of Lyngvig, steered N. 30° E. toward the Skagerrak. Meanwhile the *L–16*, Lieutenant Commander Sommerfeldt, had reached a point 60 miles to the westward of Terschelling at 5.10 p. m. to scout from there on over the Hoofden, while the *L–9*, which was assigned the adjoining area to the northward, had returned to the hangar at 4.28 from a point 60 miles to the westward of Terschelling on account of the breaking of the starboard propeller shaft, landing in Hage at 6.45 p. m. At 6.30 p. m. the *L–21*, according to the chart record of the voyage, had reached a point within 50 miles of the place of reported contact of the German forces with the enemy, but owing to the misty weather, which was seldom lighted up, and the low-lying clouds, had only a restricted field of vision. Contrary to expectations, up to that time none of the airships had sighted any surface craft, either British or German, as the visibility was variable between 3 to 10 miles. [This entire account shows most forcibly the limitations of airships.]

The German commander in chief was therefore forced to rely from the start on the screen of light cruisers and destroyers for all information regarding the enemy. At 3.28 p. m. he had learned that the *B–109*, about 85 miles WNW. of Bovbjerg, had sighted scattered enemy forces. The leading ship of Squadron III had at that time reached a position about 50 miles to the westward of Lyngvig. The enemy was therefore 50 miles to the NW. of the main body and about 25 miles SW. of the German battle cruisers. From the reports, however, it was impossible to judge the strength or character of these forces. The commander in chief therefore shifted the *Hannover*, the flagship of the rear admiral of Squadron II, to the rear of the column, and while closing the other ships up to distance for battle, held his course, speed, and formation, without approaching in line of squadrons. When, half an hour later, Admiral Hipper reported strong enemy forces, Admiral Scheer, had "clear ship for action" sounded on drum and bugle and increased speed of the squadrons to 15 knots. The next reports from the commanders of Scouting Divisions I and II brought disappointment, since the previous reports of strong enemy forces and particularly of battle cruisers were retracted. Apparently only 4 light cruisers had been sighted, which were being pursued to the northward. At 4.30 p. m. Admiral Hipper again reported strong enemy forces comprising six ships about 95 miles west of Lodbjerg on a northerly course, while the enemy light cruisers had turned away. A complete view of the situation was first obtained at 4.55 upon the receipt of the following message: "Six enemy battle cruisers and light forces in 151 gamma (95 miles west of Lodbjerg) on course SE. Scouting Division I 004 epsilon (85 miles WNW. of Lodbjerg) SSE., 18 knots. Am engaged in battle

with six battle cruisers. Request position own main body. Sig. Commander Scouting Forces." Accordingly the situation was developing very favorably, since Admiral Hipper appeared to be successful in following the operations plan of locating a part of the enemy forces and engaging them on a course to draw them toward the main body. The distance of the German battle cruisers from the latter was at that time about 60 miles. It was therefore deemed essential to support the weaker German battle cruisers as soon as possible while at the same time cutting off the retreat of the enemy forces. As time was pressing, Admiral Scheer did not assume the customary formation of column of divisions for approaching the enemy, the so-called "approach formation," but advanced in column at full speed at 5.05 p. m. on course NW., while the destroyer flotillas left their stations in the antisubmarine screen and formed on their leaders. This decision, together with the position of the main body, was transmitted to the commander scouting forces by radio. The situation appeared to be developing more favorably than was first assumed, as far as Scouting Divisions I and II were concerned, since no further strong enemy forces were reported. Thus, Admiral Scheer believed he had sufficient time for a large enveloping movement and therefore at 5.18 changed course of the squadrons to west, in order to bring the enemy battle cruisers between his own main body and the scouting forces, thus preventing the enemy from escaping at high speed upon sighting the German fleet. But even while course was being changed the commander of the Scouting Division II reported a battleship squadron of five ships to the northward of the six enemy ships following the latter on course SE. which threatened to join in the engagement between the battle cruisers and damage or cut off the German ships. Under these conditions the situation must become critical for Admiral Hipper in a short time. Furthermore, the westerly course of the main body then appeared unfavorable for an oversight of the battle and the further development of the action. Admiral Scheer was thus compelled to abandon the scarcely initiated enveloping movement and to proceed at full speed to form a junction with his battle cruisers. At 5.25 he therefore resumed column formation for all squadrons and returned to course north.

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SKAGERRAK—FIRST PHASE—ACTION OF THE BATTLE CRUISERS AND PURSUIT OF BRITISH TO NORTHWARD

For more than a half an hour the cruiser action raged. Since 4.40 p. m. the signal, "Fire distribution from the left," had been flying on the *Lutzow*, the flagship of Admiral Hipper. But the German commander still hesitated to give the signal to open fire, as the range of the leading enemy ship at that time was 18,700 meters by range finder. This was about the extreme range for the 30.5-cm. (12-inch) guns of the *Lutzow* and *Derfflinger*, while the 28-cm. (11-inch) guns of the *Moltke* could only fire at ranges less than 17,850 meters. On the other hand the *Seydlitz* and *Von der Tann* had 28-cm. guns, which could range to 19,200 and 20,500 meters, respectively. At these ranges the elevation of the guns on the *Lutzow*, *Derfflinger*, and *Moltke* was 13.5°, on the *Seydlitz* 16°, and on the *Von der Tann* 20°. The reason for this reduced angle of elevation on the newer ships is given North Sea, Volume III, page 207. All 15-cm. (6-inch) guns had an extreme elevation of 19°, giving a range of 14,950 meters.

As a matter of fact the 30.5-cm. (12-inch) guns of the English rear ships could not range over 17,000 meters, but the 34.5-cm. (13.5-inch) guns of the three leading ships had a range of not less than 21,000 meters, while the *Tiger* had a range of over 21,900 meters. On account of the decisive effect of the first hits Admiral Hipper had to make every effort to pass that danger zone, in which only the British ships could fire, as rapidly as possible. At 4.45 p. m. he therefore changed course of the battle cruisers two points to starboard to SSE., thus bringing the ships in line of bearing for a more rapid approach to the enemy. To the general surprise, however, the enemy guns remained silent, though as a matter of fact the British were still in the midst of an evolution. Admiral Beatty was well aware of the tactical advantage which the longer range of his guns afforded him, and one would suppose that he would utilize this advantage by means of the superior speed of one or two knots which his ships possessed, particularly in view of the fact that the larger caliber guns and the additional speed of his ships had been obtained at a sacrifice of protective armor. It was shown, however, as in the previous action at the Dogger Bank, that the theoretical requirements of the British gunnery tactics—to engage the enemy at the greatest possible range and beyond the range of the enemy guns—

was not so easily carried out in practice. Entirely aside from the fact that the English range-finder development had not kept pace with the increased range of the guns, the sun gauge to the westward proved the most unfavorable for visibility, since the silhouettes of the German ships with their light gray painting were indistinct and blended into the background of sky and water. Thus, even when the range was reduced to 18,000 meters, Admiral Beatty still believed himself to be outside of the effective range of his guns. Not until 4.45 did he change to the projected battle course ESE. with his flagship, while the other vessels sheered out of column on signal, to form line of bearing NW.–SE., a formation which appeared to be the most favorable for avoiding smoke from the stacks and the guns with the prevailing wind NW.

The British battle cruisers were still in the midst of this evolution when, at 4.48, the guns of the entire German line blazed out. [See fig. 10. From the German charts of the battle the opening range was 16,000 yards instead of 17,000 yards, as given in fig. 10.] Half a minute later the leading British ships opened fire, followed only some time later by the rear ships *New Zealand* and *Indefatigable*. The first salvo from the *Lutzow*, Captain Harder, was fired at 15,400 meters, the *Derfflinger*, Captain Hartog, and the *Seydlitz*, Captain von Egidy, at 15,000 meters, the *Moltke*, Captain von Karps, at 14,200 meters, and the *Von der Tann*, Captain Zenker, at 16,200 meters. Thus, in accordance with the signal, "Fire distribution from the left," each ship in the German line fired on the corresponding enemy ship, except the *Von der Tann*, which fired on the rear ship instead of the fifth ship, thus leaving the *New Zealand* unengaged, owing to the smaller number of German ships. On the other hand, Admiral Beatty was attempting to take full advantage of his numerical superiorty by concentration of fire from his two leading ships on the *Lutzow*. Therefore, the *Queen Mary*, as third ship in the British column, should have taken the *Derfflinger* under fire. This ship, however, had not made out the signal for fire distribution and fired at first at the *Seydlitz*, so that for about 10 minutes, the *Derfflinger* was not under fire from any ship. Further, the *Tiger* had also missed this signal, and opened fire on the *Moltke*, together with the *New Zealand*, so that that vessel, as well as the *Lutzow*, was under concentrated fire from two ships. Only the *Seydlitz* and the *Von der Tann* fought ship against ship—i. e., the *Queen Mary* and *Indefatigable*. As a result of the unfavorable visibility conditions and the unreliable range-finder readings, the fire from the British ships was at first very slow. As was observed from the *Regensburg*, which at the time was cruising about 2,000 meters on the unengaged side of the German line at the head of Flotillas II and VI, the shots were far over the German

battle cruisers, so that for a time the *Regensburg* and the destroyers were in greater danger than the larger ships. One enemy battle cruiser, probably the *Tiger*, fired for about 10 minutes at the range of the *Regensburg* while the latter was abeam of the *Moltke*. The advantage of the weather gauge lay with the Germans, since the smoke of gunfire and from the stacks cleared quicker from the field of vision.

Further, it was much easier for the Germans to get on the target on account of their excellent range finders and observation instruments. Besides, the newly constructed periscopes of the target-bearing director, by means of which all guns of the battery were kept constantly trained on the enemy, with electric repeaters, permitted the observer to make out all details of the enemy ships, even at extreme range and greatly assisted observation of the effect of hits. In the German fleet all the training had laid great stress on the importance of "getting on" quickly and rapid fire. The results of this training soon showed up brilliantly, and the gunnery officers of the battle cruisers, Commanders Paschen and Von Hase, Lieutenant Commanders Foerster and Schirmaker, and Commander Mahrholz, were able to attain considerable fire superiority over their opponents. For a space of one or two minutes the British battle cruisers disappeared entirely in the midst of the columns of water thrown up by the German shells. After the first salvo at 4.51 p. m. the *Lion* and *Princess Royal* were each hit twice and the *Tiger* four times. (These and other hits described are from British reports and not German observations.) While the two hits on the *Lion* resulted in a number of casualties among the 10.2-cm. (4-inch) guns crews, one of the heavy caliber hits on the *Princess Royal* put the forward turret out of action. Ten minutes later one of the guns in this turret was again made ready for action, but the other remained out for the entire battle. Shortly thereafter the second turret was hit. This shell did not penetrate the armor, but, exploding outside, filled a number of compartments with smoke and gas, while the electric generators going out of commission left the ship in darkness. The damage done to the *Tiger* at the beginning of the action was even greater. As early as 4.52 p. m. this vessel was hit in the forecastle. Immediately afterwards two shells of a salvo of four penetrated the ship. One of these pierced the 23-cm. (9-inch) armor of the after-turret barbette, but unfortunately did not explode and remained resting between the two guns in the middle of the turret. The other shell detonated on striking the armor of the third turret and, in addition to putting both guns out of commission for some time, destroyed the range finder and periscope. Owing to the fact that two of the *Tiger's* turrets were out of commission for a while it was difficult for the battery to keep on the target.

Meanwhile Admiral Beatty, by an increase of speed which forced the rear ships to steam at 26 knots and, through gradual small changes in course to starboard, had brought the enemy to bear more and more on the quarter. This brought the battle lines closer together so that the fairly powerful German secondary battery was soon enabled to open fire. The latter had to be diverted shortly toward a number of British destroyers which had dropped too far back on the quarter, owing to the change of course of their own squadrons, and which now sought to regain the head of the column by steaming between the two battle lines, whereby the heavy smoke from their stacks still further obscured the British view of the German cruisers. At 4.54 p. m. the distance between the two forces had dropped to 11,800 meters according to the English range finders, and Admiral Beatty had just ordered the rapidity of fire increased when, for the first time since the German ships had swung into column, the *Queen Mary* made two hits on the *Seydlitz* at 4.55 and 4.57. One of these struck the electric switchboard of the forward distribution room, putting it out of commission, while the other penetrated the barbette armor at the first loading stage of the intermediate turret and caused the powder cases lying there to explode. The turret was out of action and practically the whole turret's crew was killed in the resulting flames, but it was possible to flood the lower magazines in sufficient time to avoid more serious damage. At 5 p. m. the *Lutzow*, the flagship of the German forces, was struck for the first time. A salvo of heavy caliber shell penetrated the forecastle, but did not result in any damage which would impair the fighting efficiency of the vessel. Meanwhile, at 4.57, Admiral Beatty had turned away two points from the enemy, in order to increase the range in view of the light armor of his ships and to withdraw as rapidly as possible from the all too effective fire of the German guns. Two minutes later Admiral Hipper made a simultaneous change of course of one point away from enemy, bringing ships into line of bearing in order to hinder the enemy in spotting on. But neither the small changes in course, nor the last change of two points could throw the Germans off their targets. On the contrary, the battle raged with greater intensity with every minute, and soon the German gunnery reached its maximum effectiveness. The four-gun salvos of the individual German cruisers now followed each other at 20-second intervals, and threw up such columns of water around the enemy ships that the latter literally appeared to be steaming through a series of fountains. On the *Princess Royal* the after turret was put out of action by a heavy caliber shot, while another penetrated the upper deck in the wake of the middle turret.

At 5 p. m. the *Lion* received a hit which might easily have proved fatal. This heavy caliber shell struck the turret located between the two after smokestacks, knocked off a part of the turret roof, then exploded over the left gun and ignited the powder charges behind the guns and in the hoists. The turret's crew was killed, with the exception of two men. The mortally wounded turret officer, however, ordered the doors closed to the magazines and same to be flooded in sufficient time to save them. The flames, which then spread rapidly throughout the entire turret and handling room, were not able to ignite the numerous charges of powder stored in the magazines and to this they owed the fact that the British flagship did not meet the same fate as the *Indefatigable*, the rear ship of the line. This ship had been under fire from the *Von der Tann* for only about 15 minutes when at 5.03 the latter vessel observed that the British battle cruiser disappeared after two severe explosions in the middle and after parts of the ship, which sent up clouds of smoke over twice the height of the masts. As determined from observations on the *New Zealand*, the next ship in the line, the *Indefatigable* seemed to be hit near the stern by two or three shells of the same salvo. Smoke poured out of the afterpart of the vessel without any flames being seen; and, while the ship failed to follow in the wake of the ship ahead in turning to port, shortly after began to sink by the stern. Immediately thereafter two further shots struck the ship, one in the forecastle and one in the forward turret. Even this time there was no evidence of either fire, flame, or smoke. The shell had pierced the armor without premature explosion and penetrated the hull of the ship; only 30 seconds later was the tremendous effect of these shell apparent.

Beginning from forward, flames and smoke burst through the hull, then an explosion followed, which lifted parts of the wreckage as high as 60 meters in the air. The damaged cruiser listed far over to port and capsized, taking with her 57 officers and 960 men. (Two survivors of this vessel were later picked up by the German destroyer *S–68*.) [Note B, fig. 11.] Fifty-two 32 cm. shell and 38 15-cm. shell fired by the *Von der Tann* at ranges from 16,200 to 12,300 meters had sufficed to bring about this result. With "change of target to the left," the *Von der Tann* then shifted her fire to the fifth ship, the *New Zealand*, at which 52 heavy caliber shell were fired up to the time when it became necessary to make another change of target in the further progress of the action. On the sinking of the *Indefatigable*, the *New Zealand* also ceased fire on her previous target and opened on the *Von der Tann*. The nervous tension on both sides, the deafening thunder of the heavy artillery, the shriek of shell passing over the ships, and the iron discipline, all contributed to focus the attention of the personnel on their prescribed duties, so that few even noticed the sinking of the *Indefati-*

gaole. In particular, on board the *Lion* they had enough to do to look out for themselves, since between 5.03 and 5.07 not less than six shots fired by the *Lutzow* struck the ship one after the other, starting numerous fires and causing a great number of casualties among the crew. From observations on the *Lutzow*, it appeared at this time as though the British flagship listed 10° to starboard and sheered out of the line, disappearing behind the other ships enveloped in smoke. From the other German ships in the line, the effectiveness of their gunfire was unmistakable, while observations of the hits showed clearly the penetrating power and explosive force of the shell. At times the enemy fire ceased entirely, and even the tactical formation of the English line seemed somewhat disorderly.

The reason for this lay in two different circumstances, which are set forth in British accounts. In the first place, the smoke from the leading ships as well as the five destroyers which were steaming toward the head of the column between the battle lines, was particularly detrimental to visibility, with the prevailing northwesterly winds, so that Admiral Beatty, at 5.06, had turned out one point farther to starboard. At the same time, the line was alarmed by messages from several ships, reporting approaching torpedo tracks. These torpedoes had been fired by the *Moltke* between 5.04 and 5.08 at ranges of from 10,500 to 9,500 meters with angles on her own bow of 45° to 55°. This was the only ship in the German line which deemed the time propitious for making use of the torpedoes—in which weapon the German cruisers were superior to the British—and had fired four shots at the *Queen Mary*, the third ship in line. At 5.11 the track of a torpedo was sighted close under the stern of the *Lion*, a second passed under the *Queen Mary*, while a third was observed by the destroyer *Landrail* to pass through the line between the *Tiger* and *Princess Royal*. Strange to say, the impression was created on both the *Lion* and the *Princess Royal* that the torpedoes sighted had been fired from the unengaged side, and could therefore only have been fired by submarines. Admiral Beatty was further strengthened in this erroneous assumption by the fact that the *Landrail*, which at the time was steaming abeam of *Lion* thought to have sighted a submarine periscope, shortly before the torpedoes were observed, while at the same time the light cruiser *Nottingham*, which was somewhat farther ahead of the line, reported a second submarine to starboard. Admiral Beatty therefore firmly believed, at the time, that he was passing through a line of German submarines; and, while up to then he had found the smoke from the destroyers *Landrail* and *Lydiard*, which were on the unengaged side, most disturbing, he was now thankful for the protection these could afford his ships, as an antisubmarine screen.

Whether or not these reports of torpedo tracks which so disturbed the British line were due to the torpedoes fired from the *Moltke* or were simply a false alarm is difficult to determine. With regard to the time the torpedoes were fired and the reports of their being sighted, the distance appears too great and the time interval too short for these to have reached the target. Even then, two of the torpedoes, after passing the enemy line, would have had to describe a curve at the end of their run and so create the impression that they had been fired from the unengaged side. In particular, the fact that these torpedoes might be responsible for the sinking of the *Queen Mary* seems highly improbable.

The impression created on the German flagship from the start was that the enemy was striving to increase the range, so that at 5 p. m., Admiral Hipper was forced to change course from SE. by S. to SSE. and to S. by E. with constantly increasing speed, in order not to draw out of range. When, shortly after the sinking of the *Indefatigable*, a new change of course was observed on the part of the enemy, Admiral Hipper, not caring to lose the superiority in fire which he had just obtained, turned to course S. by W. at 5.10 in order to approach at a sharper angle. [Fig. 12. It must be remembered that the German courses are magnetic. S. by W. (magnetic) is actually 177° (true), approximately that shown in fig. 12.] This new evolution, however, brought him within the danger zone of enemy torpedoes, and at 5.11 a torpedo fired at a sharp angle described a circle at the end of its run directly ahead of the *Moltke*, while a second torpedo passed close astern. Further, this approach to the British line brought the German cruisers well within gun range of the Fifth Battle Squadron and thus threw the balance of the British numerical superiority into the scale.

At 4.57 this squadron was still some 7 miles astern of the British battle cruisers, and the latter were shrouded in smoke shortly after the opening of the engagement, so that the German forces which were firing at them could not be distinguished. Further, the Fifth Battle Squadron had received no signal directing it to join in the engagement. Rear Admiral Evan Thomas, therefore, advanced farther to the eastward and shortly sighted the faint outlines of three light cruisers on southerly course at a great distance about four points on the port bow. These were the ships of Scouting Division II, which, owing to the rapid development of the action, had not yet been enabled to reach their prescribed station at the head of the line and were at that time about 7 miles astern. At the same time, the commander of Scouting Division II, Rear Admiral Boedicker, sighted five masts on the western horizon, while shortly thereafter two stacks were made out behind each mast. From this he assumed the vessels to be five ships of the Second Battle Squadron

and reported them as such by radio. Only when a second mast was distinguished on each ship was he able to recognize them as four ships of the *Queen Elizabeth* class. The newest, strongest, and fastest battleships of the British fleet had appeared on the scene of action. Hardly had these ships been made out when the first 38-cm. salvo struck near the *Frankfurt*, *Elbing*, and *Pillau* at a range of 17,000 meters, forcing these vessels to make a simultaneous change of course to the eastward and retreat behind a smoke screen. In this maneuver, they were supported by one of the five boats of the Twelfth Half Flotilla, the *G–37*, Lieutenant Commander von Trotha, which had remained far astern. [Note Z, fig. 11.]

Soon thereafter a better target was offered the Fifth Battle Squadron. While Rear Admiral Evan Thomas was pursuing the light cruisers to the eastward, he sighted the German battle cruisers to the southward at 5.05 and discovered shortly after that Admiral Beatty had changed from his original battle course farther toward the southward. Thus opportunity was offered for the Fifth Battle Squadron to reduce the distance to the battle cruisers, which had by that time increased to about 8 miles, and to support the hard-pressed leader of the latter as quickly as possible. Admiral Evan Thomas therefore swung into the wake of the battle cruisers, and, as soon as steady on the new course, the *Barham*, in the lead, opened fire on the rear ship of the German line (*Von der Tann*) at an estimated range of 17,400 meters at 5.06 p. m. In this the leader was soon joined by the *Valiant*, *Warspite*, and *Malaya*, which concentrated by pairs on the two rear ships *Moltke* and *Von der Tann*. As the Hydra grew new heads for each one cut off, so the *Indefatigable* was hardly sunk before four new and powerful opponents appeared in its place. Fortunately, however, the German ships at that time were so clouded in smoke and mist that at the great range of the Fifth Battle Squadron hardly more than two ships at a time could be made out from the latter vessels. Frequently, the flash of gunfire from the German ships was the only visible indication of their location. Also, the destroyer flotillas of the Fifth Battle Squadron made the mistake of attempting to steam up to position between the lines of combatants, whereby the smoke from their stacks further obscured the field of vision. The fire from the batteries of the four *Queen Elizabeths*, which were equipped with the most modern firing directors, proved very effective, particularly since the German ships were each engaged with the opposite ships in the battle cruiser formation and had no guns available to return this fire. Soon thereafter the rear German ships were smothered in a veritable barrage of 38-cm. (15-inch) shell, in which the well-bunched full salvos struck all around at very short

intervals. The shell striking in the immediate vicinity of the ships' sides caused the hulls to vibrate and rock, and early in the course of the action the *Von der Tann* was struck well toward the stern by a heavy-caliber shell fired from the *Barham*. The heavy impact of this shot at the extreme end of the ship started the whole hull in longitudinal vibrations like a tuning fork. The shell penetrated the joint between two armor plates under water, detonated, and forced pieces of the armor through several decks. The steering engine ran hot, the rudder compartment was flooded; but the worst catastrophe, a breakdown of the steering apparatus—such as occurred with the *Blucher* at the Dogger Bank action and delivered the ship up to the pursuing battleship—was avoided. The rudder continued to function after a short interval, the bulkhead of the after machinery space was shored up, and finally only 600 tons of water remained in the ship after counterflooding had reduced the drag astern to 2° with an increase in draft to 10 meters.

At 5.16 after numerous straddling salvos, the *Moltke* was also hit. A 38-cm. shell penetrated a coal bunker, demolishing the hoist of a 15-cm. (6-inch) gun, while the flames of the explosion wounded the crew supplying ammunition; then the casemate deck near the gun was pierced, putting both gun and crew out of action. For a while thereafter these two ships were able to avoid the too well-bunched salvos by means of small changes in course and speed regulated with regard to the enemy fire-control system.

Meanwhile, the intensity of the action between the cruisers had gradually fallen off since 5.06 p. m., with increasing range, in spite of all efforts of Admiral Hipper to maintain close contact with the enemy. Spotting became more and more difficult for both sides, except when one's own salvos struck at the instant the enemy salvo blazed out; according to English accounts, the German salvos lay mostly short at this time. On the other hand, enemy "shorts" threw up tremendous splashes near the German ships, thus considerably restricting the view of the enemy. While better spotting could have been done from higher up in the masts, the German ships, contrary to the British system, were at that time not equipped to control the fire from these elevated stations. As the range increased to over 18,000 meters, on the German ships the point of aim was shifted from the water line to the upper edge of the stacks, and finally to the fighting tops of the enemy ships, but even this did not avail for long, and fire had to be ceased entirely for a time. Also at this time the fire of the British ships weakened considerably, since they, as well as the Germans, had to avoid wasting the limited supply of ammunition under these unfavorable conditions for spotting and at the long range. Even at 5.10 p. m. the *Tiger* had great

difficulty in holding the target, since the *Regensburg*, which was in position at the head of the German line, was frequently counted in as one of the battle cruisers. [A most interesting fact.] Thus, the *Tiger*, owing to this error, from then on fired on the third ship (*Seydlitz*), instead of the fourth ship of the German line (*Moltke*). Periodically, some of the English ships had to cease fire entirely. When, however, Admiral Beatty saw that the Fifth Battle Squadron had joined the action, he sought to close the range again with his battle cruisers, in order to bring pressure on the head of the German line at the same time the enemy's rear was under fire.

At 5.12 he therefore turned two points, and at 5.15 two points farther toward the enemy. Since Admiral Hipper had held his course S. by W., and had only made a small change to column from line of bearing to bring his rear farther out of range of the fire from the Fifth Battle Squadron, both cruiser forces began to approach each other very rapidly and soon the artillery duel was renewed in intensity. Again the *Lion* lay in the midst of heavy fire from the Germans, received several hits, and for a time was so enveloped in the smoke of the fires which were started that she was scarcely visible to the ships astern of the *Lutzow*. Therefore, the *Derfflinger*, now mistaking the *Queen Mary* for the second ship in the British line, shifted her fire to the latter at 5.16. At 5.17 a shot from the *Queen Mary* put one of the 15-cm. (6-inch) casemate guns of the *Seydlitz* out of action. At 5.20 a shell penetrated the barbette of the forward turret of the *Von der Tann*. The turret was put out of action and jammed. The magazine was flooded, but the explosive effect as well as the danger from gas and smoke of all these shells was found to be very small. Apparently, the shell had splintered on impact, as was observed in the case of many of the enemy shell. Of the turret's crew, only a few, including the turret officer, were slightly wounded by the flames. Three minutes later, a third shell pierced the armored gun deck, striking between the barbette and the roller path of the after turret, killing six men. This turret, with flooded magazines, could only be made ready for action again after clearing away the wreckage and springing into place the bent deck plates. The damaged air ducts soon filled both steering engine compartments with smoke and gas, causing them to be abandoned for about 20 minutes; the rudder operating meanwhile without derangement. Parts of the torn torpedo net could be cleared before they came foul of the propellers, a casualty which would have rendered the ship helpless. At the same time, the first casualty to the radio occurred, the heavy shock of the hits breaking the wires of the main antenna. Fortunately, the ship was so enveloped in smoke from the last shot striking the after turret that

the *New Zealand*, which was only hit once, shifted fire from the *Von der Tann* to the *Moltke*.

At 5.26 p. m. this ship was also struck near the stern. The protective bunker and water-tight bulkheads were pierced, but the torpedo bulkhead held, keeping the water away from the vital parts of the ship. Immediately thereafter, at 5.27, a further shot struck the side armor at the water line, leaving a hole about 0.5 meter in diameter, then exploded in a coal bunker, pierced the gun deck, but did not penetrate the armored deck. While these events were taking place at the rear of the line, the range had fallen rapidly from 18,400 to 13,200 meters and now the German shells again rained like a hailstorm on the British battle cruisers. Although Admiral Beatty immediately turned away two points, the *Princess Royal* was struck at 5.26 by a shell from the *Lutzow*. At the same time, the *New Zealand* and the *Tiger* were each struck once, and in particular the *Queen Mary*, already hit twice, began to suffer under the concentrated fire of the *Seydlitz* and *Derfflinger*. At 5.26, while the *Seydlitz* was firing at this vessel at a range of 13,500 meters and the *Derfflinger* at 13,200 meters, the leading German ships suddenly saw the masts and smokestacks of the *Queen Mary* collapse, and smoke and flames from the hull poured to a height of 700 meters, in which the *Tiger* and *New Zealand* entirely disappeared.

As observed on board the *Tiger* and *New Zealand*, this ship was hit simultaneously by three shots of a four-gun salvo. It appeared from the splinters and the dull red heating on impact almost as though these shells had not penetrated (which must have been the case), when two further shells struck the ship. Even in this case, the first results appeared like small puffs of smoke shooting out through the holes made by the shell, but this was followed by a tremendous dull red flame with heavy black smoke from the middle of the hull as though the ship had split wide open. A similar sight was noticed in the fore part of the vessel, the battle cruiser broke together in the middle, while the turret roofs were thrown 30 meters in the air and the hull disappeared under water with the exception of the stern and the still revolving propellers. It was only with the greatest difficulty that the *Tiger*, which was following in the wake of this ship at a distance of 450 meters (500 yards) was able to sheer out to port to avoid the wreck. Passing this abeam at a distance of only a few meters, burning wreckage was thrown on the decks of that cruiser, while clouds of poisonous gas fumes were drawn into the ventilating system and filled the aftercompartments. The afterpart of the *Queen Mary*, from stack to stern, was still above water as the *New Zealand*, after sheering out to starboard, passed abeam at a distance of 150 meters. Now, however, this floating wreckage capsized with a final explosion and disappeared

under the waves. Fifty-seven officers and one thousand two hundred and nine men were lost with this ship. Six men were picked up by the destroyers *Laurel* and *Petard*, while two men were rescued by the German destroyer *V–28*. All that remained of the *Queen Mary* was a large cloud of smoke which spread out like a gigantic pine cone and for some time obstructed the clear view of the German ships from the rear of the British line. *Tiger* and *New Zealand* were forced to go to reserve speed to close this opening and take proper distance from the *Lion* and *Princess Royal*.

With the superiority of fire which the German ships at the head of the column obtained at that time, it is understandable how they received but few hits in this phase of the action. But the rear ships of the line, *Moltke* and *Von der Tann*, were more and more endangered by the fire from the Fifth Battle Squadron. These were practically not under fire at all, although at 5.18 the *Von der Tann*, as the only one of the German cruisers, opened on the *Barham*. At 5.23 a hit was made on the latter, but after firing 24 shots at from 15,500 to 17,000 meters, the German cruiser was forced to shift again to its previous target, the *New Zealand*, after both center turrets had been put out of action and the target had shifted, bearing unfavorably. Now occurred on the *Von der Tann* another severe casualty, which was not due to the enemy. The recoil cylinders of the hot guns in the second turret failed, so that from now on, the cruiser could fire only two guns of her main battery.

With the Fifth Battle Squadron joining the action and the sinking of the *Queen Mary*, the artillery duel had reached an intensity which could hardly be exceeded. At the same time, with the gradual decrease in the range between the two battle lines, the time was approaching when it would be possible to bring the destroyers into action. On account of the development of the engagement on southerly courses, each side had succeeded in bringing only a part of their light forces into position for attack at the head of the line, while the rest of these forces were steaming up to take station. In spite of that, Admiral Beatty, at 5.09, or only a few minutes after the loss of the *Indefatigable*, had ordered the attack of the eight boats of the Thirteenth Flotilla and the four boats of the Ninth and Tenth Flotillas, which were leading, in order to relieve his hard-pressed ships. On account of the damage to the radio installation on the *Lion*, it was 5.15 before this signal could be relayed to the *Princess Royal*, and even then, five minutes more elapsed before the leading group of the Thirteenth Flotilla—which was commanded by Capt. J. U. Farie in the light cruiser *Champion*—could reach a position to attack with the destroyers *Nestor*, *Nicator*, *Nomad*, *Narborough*, and *Pelican* under Commander Bingham. At the time, the

German line of battle cruisers bore northeast distant about 8 miles. These destroyers were followed by a second group, *Obdurate*, *Nerissa*, and *Termagent*, while of the third group of destroyers, *Narborough*, *Pelican*, *Petard*, and *Turbulent*, the last two were forced out by the light cruiser *Nottingham* and could only pass through the line, to attack some time later, followed by the destroyers *Moorsom* and *Morris*. [Figs. 12 and 13.]

On the German side at this time only Flotilla IX, under Commander Goehle, had reached position ahead of the line of battle cruisers, and on the close approach of the latter to the enemy line in order to gain a decision these boats took formation for immediate attack. At the same time Commodore Heinrich, second leader of destroyers, had approached in the light cruiser *Regensburg* and ordered the full force to attack when range-finder reading showed the range of the enemy forces to have decreased to 10,000 meters. Before the *Regensburg* had hoisted the red-checkered "Z" as a signal to attack, Commander Goehle had reached the same decision as a result of the rapidly decreasing range and with the group *V–28*, *V–26*, and *S–52* (Lieutenant Commanders Lenssen, Koehler, and Ehrentraut) had crossed the line ahead of the *Lutzow* and headed for the center of the enemy line. The leader of the Seventeenth Half Flotilla, Lieutenant Commander Ehrhardt, was followed by the boats *V–27*, *S–36*, and *S–51* (Lieutenant Commanders Buddecke, Franz Fischer, and Dette), then the group *V–29* and *S–35* (Lieutenant Commanders Steinbrinck and Ihn), while as fourth group followed the chief of the Eighteenth Half Flotilla, Commander Werner Tillessen, with the *V–30*, *S–34*, and *S–33* (Lieut. Ernst Wolf and Lieutenant Commanders Andersen and von Münch). Scarcely were the German boats clear of the line when they were approached from the southward by the English destroyers, which were steaming to attack the battle cruisers. While the artillery duel continued between the main batteries of the battle cruiser forces the secondary batteries opened on the destroyers. At the same time the light forces came together in a running fight between the lines in a sea which was cut up with the splashes of shell, and soon this action developed into numerous individual engagements, where both gunfire and torpedoes were used at close quarters. The sequence and details of these fights can hardly be enumerated. At 5.33 the *Nomad*, the second boat of the group *Nestor*, was hit in a boiler room by the *S–51* (Dette) of the Ehrhardt group, and shortly after was hit by a torpedo from the *S–52*, the third boat of the group Goehle. [The torpedo hit is not mentioned in English accounts.] Immediately thereafter the *Petard*, following the *Turbulent* of the *Nestor* group, fired a torpedo at the *V–29*, leader of the Steinbrinck group;

but even in sinking this boat was able to fire four torpedoes at the British line.

Owing to these fights with the larger and faster British destroyers, the other boats of Flotilla IX were unable to approach the enemy ships closer than 7,000 to 8,000 meters. From 5.34 to 5.35 p. m. 10 torpedoes were fired, particularly against the second, third, and fourth ships. At 5.34 the *Lutzow* also fired a torpedo against the third ship in the British line, while the enemy battle cruisers and battleships made simultaneous changes of course of two points after the *Queen Mary* had blown up. That the loss of the latter ship may be attributed partly to the torpedoes fired by Flotilla IX appears, according to English observations, to be extremely doubtful. But, even if this was not the case, the attack had the result that the British fire against the German cruisers was weakened to a large extent. Immediately after the attack, the boats on returning were forced to break through the enemy destroyer groups with a resultant lively artillery duel. Thus, at 5.34 the *V–27*, leader of the Ehrhardt group, was hit twice in the starboard side of the machinery space, cutting the main steam line, so that the boat had to be blown up, owing to the approach of the four *Queen Elizabeths*. In the midst of enemy fire, the *V–26* (Hans Koehler) went alongside and rescued the entire crew of the *V–27*, among them two severely wounded men, sunk the latter boat by gun fire, avoided a torpedo fired by another destroyer, and rescued the greater part of the crew of the *V–29* (Steinbrinck). [A particularly gallant exploit. The Germans throughout the battle paid great attention to rescuing the crews of their disabled ships.] The rest of the crew were saved by the *S–35* (Lieutenant Commander Ihn), which then returned with the other boats to the *Regensburg*, the flotilla otherwise having sustained only minor casualties. This light cruiser, the only one enabled to take station ahead of Scouting Division I, had advanced to the SW. to cover the attack and the retreat of Flotilla IX, and followed by the *G–101*, *G–102*, *G–103*, *and G–104* of Flotilla II, had contributed largely to the relief of Flotilla IX by their effective gunfire and thereby assisted in the saving of the crews of the *V–27* and *V–29*. An attempt to bring the *G–103* (Lieut. Commander Fritz Spiess) and *G–104* (Lieut. Commander von Bartenwerffer) in position for attack on the enemy line failed, since the latter now turned away to the northward.

The English destroyer attack could not be fully developed on account of the German counterattack. The *Obdurate*, *Narborough*, *Pelican*, *Moorsom*, and *Morris* were forced out, the *Obdurate* receiving two hits. Meanwhile, the *Nestor* and *Nicator* had approached the German line to 4,500 and 5,500 meters and each had

fired two torpedoes against the *Lutzow*; one fired by the last-named destroyer broached after leaving the tube.

The danger from this attack was promptly recognized by Admiral Hipper. After the course of the battle cruisers had been changed to SE. at 5.28, a simultaneous change of course was made to ESE. during the destroyer attack, and finally at 5.36, course was further changer to east. Therefore, the torpedoes fired by the *Nestor* and *Nicator* passed the German line without effect. But at 5.28 Admiral Hipper changed course again to SSE., and at 5.41 he went back to the original course of S. by W. in order to close with the enemy once more. In spite of all his success, however, the position of the German cruisers would soon have become critical, since they were fighting against a superiority of two to one after 5.11, even after the *Queen Mary* and *Indefatigable* had been sunk. On the German battle cruisers, such fears had scarcely been formulated when smoke was sighted to the southward, and messages were sent by voice tube to all battle stations, which could hardly have caused more rejoicing than a similar message on December 16, 1914, and January 24, 1915. This message was, "Our own main body in sight."

At the same time, the movements of the enemy showed that they too had noticed this new appearance on the scene of action. The German cruisers had just turned away toward the east from the destroyer attack when Commodore Goodenough, on board the *Southampton*, sighted the mast of a light cruiser with four stacks, at 5.30. At that time the *Southampton* was leading the Second Light Cruiser Squadron, and about 2 miles ahead on the port side of the *Lion*. The light cruiser, which was sighted, was the *Rostock*, which was steaming ahead of the German main body. Three minutes later, the *Southampton* sent the surprising message that battleships were sighted to the southwest. Approaching these at high speed, that vessel was soon able to make out the ships of the German battle fleet, an appearance which at first seemed unbelievable to the British. It was a moment of greatest importance when the *Southampton*, at 5.38 p. m., sent the following very urgent message with priority to the commander in chief and commander battle cruiser fleet. "Have sighted enemy battle fleet to southeast. Course of enemy is north. My position is 56° 34′ N., 6° 20′ E." [Note E, fig. 13.]

This signal was all the more surprising to Admiral Beatty as, up to that time, he was firmly convinced that Admiral Scheer had not yet left the Jade. But any doubts which he may have had as to the accuracy of this report were dispelled by a message sent at the same time by the *Champion*, which had advanced to the southeast to cover the destroyer attack: "Course of enemy battle fleet is ENE.,

formation column. Dreadnaughts leading. Middle of enemy line bears SE. My position is 56° 51′ N., 5° 46′ E."

This position given by the *Champion* was in error, owing to a mistake in reckoning, and was really 12 miles farther south, while the true position of the *Southampton* was 13¼ miles to the westward of the position reported. The errors made no difference to Admiral Beatty, who had both cruisers in sight, but were to prove of the greatest importance to Admiral Jellicoe, as will be shown latter.

What was to be done? Admiral Beatty, who had sought to increase the range of the battle cruisers since 5.30, while the *Lion* engaged the *Lutzow;* the *Princess Royal*, the *Derfflinger;* the *Tiger*, the *Seydlitz;* and *New Zealand*, the *Moltke*, turned immediately to port in the direction of the newly reported enemy. At 5.40 he had visible evidence. . Twelve miles to the southeast, a battleship appeared, and then, accompanied by a swarm of light cruisers and destroyers, was seen what appeared to be an endless line of battleships. This appearance of strength, which in the whole course of the war had not been experienced and had been held to be impossible, robbed Admiral Beatty of the hope of turning the cruiser action to his favor, even after the severe losses already sustained. He had no choice. At 5.43 the signal was hoisted on the *Lion*, recalling the destroyers and ordering a turn to the reverse course for the battle cruisers and battleships. Immediately thereafter, Admiral Beatty turned the former to course NW. and at 5.46 changed with the battle cruisers to course north, in order to rejoin his own main body by the shortest route.

For this purpose, the relative positions of the flagships *Lion* and *Iron Duke* were of the greatest importance. At 5.45, Admiral Beatty therefore sent the following radio to the commander in chief through the *Princess Royal*, viz: "Have sighted enemy battle fleet bearing SE. My position 56° 36′ N., 6° 04′ E., 5.45 p. m." This message was correctly transmitted by the *Princess Royal* and properly received by some ships of the Grand Fleet, but in the shape in which it reached the *Iron Duke*, it read, "26 to 30 battleships, apparently enemy, bearing SSE., course SE." (The *Iron Duke* seems not to have received the message direct, but relayed from the *Benbow*.) Only the position of the *Lion* was correctly received, and thus the commander in chief was informed of the position the *Lion* thought she was in at 5.45 p. m. A further question was, on what basis was the *Lion* to judge the position of the Grand Fleet. According to the latest reported position of the commander in chief, this force was at 4.15 p. m. in 57° 50′ N., 4° 15′ E., on course SE. by S., speed 19 knots. If this were correct, the Grand Fleet would

have been at 5.45, in 57° 30′ N., 4° 56.5′ E.; or, 66 miles NNW. of the *Lion*. In order to reach them, the course of the cruisers should have been N. 14° W. As the course was chosen farther to the northward, this must be attributed to the fact that Admiral Beatty did not wish to lose contact with the enemy and wished further to avail himself of the cover of the Thirteenth Destroyer Flotilla which was then returning from the attack. (Narrative of the Battle of Jutland, p. 25.)

This movement of the battle cruisers was followed immediately by the destroyer flotillas and the First and Third Light Cruiser Squadrons, in order to take station at the head of the line. Only Commodore Goodenough, with the light cruisers *Southampton*, *Nottingham*, *Birmingham*, and *Dublin* of the Second Light Cruiser Squadron, pushed on the southwest at 25 knots, in order to determine the course, speed and exact composition of the enemy force sighted, and, if possible, to reach a position favorable for torpedo attack. But only the *Nottingham* was able to fire a torpedo at the German line, at 5.40, at a range of 14,000 meters, whereupon the Second Light Cruiser Squadron was forced, at 5.48, to turn off at a distance of 11,800 meters to withdraw from the rapid fire of the enemy ships. [This squadron was in line instead of column as shown in fig. 13.]

As early as 5.30 p. m., ships in action were sighted from the *Konig*, the leading battleship of the German battle fleet [the terms "battle fleet" and "main body" are both used by the author to describe the forces under Admiral Scheer's immediate command as distinct from those under Admiral Hipper], and soon thereafter the situation was cleared to the extent that on the starboard bow were sighted the ships of the Scouting Division I, while to port were two columns of enemy ships, approaching the German main body on southerly course. Of these, the easterly column were recognized as battle cruisers engaging the German battle cruisers, while the other column advancing to the southwest appeared to be light cruisers of the *Chatham* class. Between the two lines of battle cruisers, the German destroyer flotillas were returning from attack and were engaged with the British destroyers. Since Admiral Hipper was at that time engaging the enemy battle cruisers, he was not in a position to make a report on the enemy losses and the condition of his own ships; therefore Admiral Scheer, as well as Rear Admiral Behncke, commander of the leading Squadron III were forced to rely on their own observations for an estimate of the situation. From a radio message sent at 6.10 by the commander Scouting Division II, reporting the presence of only four enemy battle cruisers, it was apparent that the enemy forces had sustained severe losses. What at that time appeared to the commanders of the German battleships as an example of extraordinary courage—i. e., the approach of the

British battle cruisers to within gunfire range of the German main body—was in reality only the consequence of the complete surprise occasioned by the appearance on the scene of action of the German main body on the commander of the British battle cruiser fleet. It was evident that every effort must be made by the German forces to prevent the enemy from escaping unpunished from this dangerous position, in spite of his superior speed.

At 5.38 p. m. therefore, the German battle fleet increased speed from 15 to 17 knots, and shortly thereafter it was reported from the foretop of the *König* that the enemy capital ships appeared to be turning to a northerly course. At 5.45 the German battle fleet made a change of course of two points to port by divisions, in order to approach the enemy in seven columns. Soon thereafter it was clearly seen from the fleet flagship, which was leading Squadron I, that the enemy forces consisted of two groups of which the northerly group was composed of four *Queen Elizabeths*, while the southern group comprised four battle cruisers. The signal, "Fire distribution from the right, ship against ship," was followed at 5.46 by the signal from the fleet flagship to open fire. The head of the British column was just making the turn to the northward, when *Lion* was fired on by the *König*, *Princess Royal* by the *Grosser Kurfurst*, and *Tiger* by the *Markgraf*. The first shots of the *König* lay short of the *Lion*, on account of the extreme range (19,200 meters), even with maximum elevation of the guns, so that *König*, increasing to reserve speed, shifted after two salvos to the *Tiger*, which latter ship was under fire at various ranges from the *Markgraf*. At the same time the secondary batteries of the *König*, *Grosser Kurfurst*, and *Markgraf* fired for a short while on two enemy destroyers (*Nester* and *Nicator*) at ranges of from 12,000 to 8,000 meters. After a few salvos, one of these turned away, while the other remained in a helpless condition and sank shortly after. Also, the *Prinzregent* fired at one of the battle cruisers, but had to cease fire at 6.04, after eight salvos, since all shots were very short at that range (20,400 to 19,500 meters) and the enemy was barely visible. At 6.08 fire could again be opened under much more favorable conditions against a battle cruiser of the *Indefatigable* class (the *New Zealand*) and this was maintained at the rate of one salvo per minute, with apparently good effect. On the other hand, no other target offered at that time for the *Kaiser*, *Friedrich der Grosse*, and the ships of Squadron I, than the four ships of the Second Light Cruiser Squadron. The latter therefore lay for a time under the concentrated fire of 10 German battleships at ranges of from 13,000 to 19,000 meters, but the large number of splashes hindered the spotting to such an extent that most of these ships ceased fire after a few salvos. Only the *Ostfriesland* and *Nassau* continued the fire (6.10 to 6.15), but no

hits were made, as the enemy cruisers turned sharply to the northward and steering zigzag courses soon disappeared in the smoke.

In the effort to withdraw from the fire of the German battleships as rapidly as possible, it was not possible for Admiral Beatty to warn the Fifth Battle Squadron of the fact that the German main body had joined the engagement. Even the signal for the turn to the northward, which was hoisted on the *Lion* and intended also for the *Queen Elizabeths*, was not made out by the latter, as, at the time they were about eight miles astern. Therefore the Fifth Battle Squadron continued to engage the German battle cruisers on a southerly course. Admiral Evan Thomas had seen the battle cruisers turn to the north but could not understand the reason for this evolution and held it to be his duty to continue the action on the previous battle course. At 5.48 the leading ships of each detachment, *Lion* and *Barham*, were standing on opposite courses about four miles apart. Again the signal was hoisted on the *Lion*, "Fifth Battle Squadron alter course in succession 16 points to starboard," and the position of the German battle fleet was given. At the high speed with which the squadrons passed, however, Admiral Evan Thomas had already steamed into the lee of the battle cruisers, before the change of course could be effected. In passing, the 38-cm. guns of the *Queen Elizabeths* had to cease fire, since the battle cruisers covered their targets, and the latter ships were counted with great anxiety. The *Queen Mary* and *Indefatigable* were missing. Scarcely had the *Barham* passed the last ship of the battle cruisers when the German battle fleet was sighted in the southeast, approaching in three or four columns, and the ship found herself in the midst of an intense salvo fire. This was from the *Kronprinz* and *Kaiserin*, which at 5.50 had opened on the leading ship of the Fifth Battle Squadron at an initial range of 19,200 meters. This fire was effectively continued until the *Barham* had approached to within 18,600 meters and lay directly athwart the course of the German battleships, before turning to the northward at 5.58, in the wake of the battle cruisers.

Under this fire the *Barham* received two major caliber hits, of which the first destroyed the auxiliary radio station, while the second put the main radio out of action, thus preventing Admiral Evan Thomas from receiving further reports of the engagement and making an estimate of the situation difficult [fig. 13]. At the same time, these hits had resulted in a large number of compartments becoming filled with gases and smoke. Powder cases on the gun deck were ignited, splinters had penetrated into the lower part of the conning tower as well as into compartments under the armor deck, causing numerous casualties among officers and men. At

6 p. m. Commodore Goodenough, when about in line with the rear ship of the Fifth Battle Squadron, turned with the Second Light Cruiser Squadron to the northward at the same time. Thus the light cruisers, which were close in the lee of the battleships, were showered with splinters from the German shell. It was possible, however, for this force to avoid hits by means of clever zigzag steering, while at the same time the movements of the Fifth Battle Squadron were effectively screened. The fire of the *Kronprinz* and *Kaiserin* had aroused the impression amongst the English that the turning point of the Fifth Battle Squadron was under heavy fire, but the *Valiant* succeeded in turning in the wake of the *Barham* without being hit, and the *Warspite*, as third ship, was not less lucky, while the *Malaya* had previously made the turn and at 6 p. m. was under fire from the *Von der Tann.*

[This question of fire at a turning point in the target column is not a simple one. With a distance of 500 yards between ships and a target speed of 25 knots, fire would have to be shifted from ship to ship every 36 seconds. If fire is not so shifted, fire at a target, such as that offered by the Fifth Battle Squadron, is the most difficult imaginable because of the great change in the "rate of change" during a 16-point change of course by the target.]

Meanwhile Admiral Hipper had taken advantage of the interval of weakened fire from the enemy, while the British squadrons were passing each other, to turn in succession in a brilliant maneuver to a northerly course ahead of the German battle fleet at 5.50, steaming with reserve speed, with the *Lutzow* leading, to maintain contact with the enemy on this new battle course. In this evolution, however, he disregarded the danger which he had previously sought to avoid by a simultaneous change of course of his ships. At the time, all of the enemy destroyers had not carried out the recall signal which had been hoisted on the *Lion* since 5.43 p. m. Thus the destroyers *Petard* and *Turbulent* each fired three torpedoes at the second and third battle cruisers of Scouting Division I at 5.50, while this force was turning to the northward, and the *Nerissa* and *Termagant* fired their two torpedoes at the fifth ship. With this sudden turn to the northward, the German battle cruisers ran directly into the track of these torpedoes and only when it was too late to turn out were several torpedoes sighted by the *Seydlitz;* one of these was running on the surface, while two others were headed for the ship. Shortly thereafter, at 5.57, this ship was struck forward by one of the torpedoes. The bulkhead at frame 14 was penetrated and the forward station for electric auxiliaries was put out of action. The torpedo bulkhead held, so that the 28 and 15 cm.

magazines forward, as well as the broadside torpedo room remained in service. The ship took a slight list, which at this time was of no importance, while the full speed could be maintained.

Meanwhile Scouting Division II, under Rear Admiral Boedicker, with the Twelfth Half Flotilla (Lieutenant Commander Lahs), had sought to rejoin the battle cruisers and the *Wiesbaden*, which was accompanying them, after standing to the southward to escape the fire of the four *Queen Elizabeths*. [In fig. 13 the Twelfth and Fourth Half Flotillas should be close on the port beam of Scouting Division I, with the Twelfth leading.] At 5.25 the enemy light cruisers [the First and Third Light Cruiser Squadrons in fig. 13], which had been pursued at the beginning of the action, came in sight again on bearing NNW., and at 5.35 the *G–37*, Lieut. Commander von Trotha, which had remained somewhat in rear, cleared the rear of Scouting Division II and proceeded to attack these forces, firing two torpedoes at a range of 9,000 meters. These were apparently ineffective. Scouting Division II quickly regained station and, together with the *Wiesbaden*, formed the screen ahead of the battle cruisers on the northerly course [fig. 14], while the destroyers between the battle cruisers and Battle Squadron III proceeded to attack. While the *Wiesbaden* was steaming up to take station ahead of Scouting Division I the commander of Flotilla VI, Commander Max Schultz, had observed the enemy battle cruiser squadrons turn to the northward, while to the eastward of these vessels appeared a group of battleships. As Flotilla VI had not received reports of the position of its own battle fleet, these were not recognized as enemy ships until later. At the moment of the turn of Scouting Division I to the northerly course, Commander Schultz realized that the fire of the battle cruisers would be considerably diminished, and decided to relieve the pressure on these ships by an attack against the enemy battle cruisers, with the Eleventh Half Flotilla, Lieut. Commander Wilhelm Rümann, which alone remained with him. [Flotilla VI was composed of the Eleventh and Twelfth Half Flotillas. For the attack of the Eleventh Half Flotilla see figs. 13 and 14.] Each boat was to fire two torpedoes at the enemy ships. After an advance of 6,000 meters through the intense fire of the light cruisers and destroyers near the British line, he succeeded in reaching position from 8,000 to 9,000 meters from the enemy with the *G–41*, *V–44*, *S–49*, *V–32*, *G–87*, and *S–86*. (Lieut. Commanders Böhm, von Holleuffer, Baustaedt, Carl Karstens, and Conrad Grimm.) In all, seven torpedoes were fired, the flotilla being hindered by the retiring boats of Flotilla IX, whereupon they turned to the eastward at full speed, and, passing between Scouting Division I and Battle Squadron III, rejoined the *Regensburg*.

Although the position attained was very favorable for torpedo fire, since the battle cruisers were just passing the Fifth Battle Squadron, no hits could be observed. According to British accounts, one torpedo passed astern and one ahead of the *Valiant* but no hits were made either on the battleships or battle cruisers.

At the same time that Flotilla VI was attacking, the *Nestor* and *Nicator* were making an attack on the German battle fleet. After firing two torpedoes at the German battle cruisers, these two boats had turned to the southward and when the German battle cruisers made the turn to the northward, were offered another favorable opportunity for torpedo attack. At that time Commander Bingham on the *Nestor* suddenly sighted to the southward the line of German battleships. This was the High Seas Fleet which was suspected of still being at the Jade. He promptly decided to use his last torpedoes against these ships, and, passing through the rapid fire of the *Regensburg* and the *Rostock*, which was steaming ahead of the battle fleet, he approached the German line under fire from the secondary batteries of the latter ships. At 3,200 meters the *Nestor* fired torpedoes against the first and second ships, while the *Nicator* fired at the same targets at a range of 2,700 meters. Then the *Nestor* turned away to the northward, having been hit in the forward boiler compartment. The *Nicator*, which was barely able to avoid a collision, could not fire her fourth torpedo and turned away to rejoin the other boats of the flotilla to the westward in compliance with the recall signal on the *Lion*.

Although it had been possible for the German Flotilla IX to save the crews of the *V–27* and *V–29*, the *Nomad* and *Nestor* had been left unable to manuever near the sinking German boats, and abandoned by the English to their fate. But before they were completely destroyed by the fire of the *Rostock* and the rapidly approaching German battleships, they were able to fire their last torpedoes at the German line, even though they were ineffective. Then the survivors were rescued by German destroyers and were taken prisoner. Of the 21 torpedoes which were fired by the British destroyer flotillas in the course of this action, only one had reached the mark, and that one had not proven very effective. [Hits were made on both *V–29* and *Seydlitz*. In this particular attack there can be no doubt but that the British destroyers excelled the German, despite the disorganized character of their attack. The initiative of the British captains compensated for failures of their higher leaders. It is true that the British destroyers were much larger and more powerful than the German boats.] On the other hand, the boldly executed attack of the destroyers after the sinking of the *Queen Mary*, before the arrival of the German battle fleet, brought considerable relief to the British line, as the German battle

cruisers were forced to turn out at a critical moment, even if only for a short time.

Meanwhile, most of the German ships had attempted to hold on to the British ships with their guns, even when they were at the extreme range, in the hope of obtaining a few hits and inflicting at least some casualty before they could escape with their superior speed. Immediately after turning, therefore, the *Lutzow*, *Derfflinger*, *Seydlitz*, and *Moltke*, at 5.55, renewed their fire on the British battle cruisers, which since 5.48 were also under fire from the *König*, *Grosser Kurfurst*, *Markgraf*, and *Prinzregent*. As a result, *Lion* and *Tiger*, at 5.59, were again hit, and turned sharply to the westward, followed by the other two cruisers. Scarcely had the *Lion* returned to the northerly course at 6.01, when she was again struck by two shells at the same time. At various places new fires broke out, which could only be fought with the greatest difficulty, since the fire mains had been broken to a large extent by splinters. In particular, the fire in the turret, which was hit earlier in the action, broke out again with renewed intensity, setting fire to two powder cases and killing the entire handling-room crew, while the flames endangered the personnel on the upper decks. Soon thereafter the *Lion* passed the spot where the *Queen Mary* sank, and, barely escaping the same fate, turned with the other cruisers to a northwesterly course, withdrawing from the engagement while the Fifth Battle Squadron covered the retreat.

The destroyers *Onslow* and *Moresby*, which had been joined by the aircraft tender *Engadine* after the latter had left the First Battle Cruiser Squadron, had not noticed this new change of course on the part of their own battle cruisers and continued on course NNE., thus approaching the German line more than their own. Being eager to attack the German ships, which they had missed on account of being dispatched to the *Engadine*, they steamed to attack the German battle cruisers at 6 p. m. Before they could get within torpedo range, however, they were met by an intense torpedo defense fire from the hitherto invisible Scouting Division II, as well as from the battle cruisers which they were attacking, and were forced to turn away. In this movement the smoke from stacks so obstructed the British view of the enemy that the *Moresby* turned to the southward between the two lines. Therefore the destroyer was shortly in a good position for torpedo attack ahead of Battle Squadron III, and fired a torpedo at the third ship in the line (*Kronprinz*) at 7,500 meters, which, however, missed. Both destroyers then retired from the attack without having sustained any casualties.

Of the other destroyer flotillas, the First stood at that time with the *Fearless* near the battle cruisers, the Thirteenth with the *Champion* near the Fifth Battle Squadron, while the First and Third

Light Cruiser Squadrons were to starboard ahead of the line and the Second was astern to port.

As a result of torpedo-defense fire, the smoke from the stacks of the destroyers, the fires on the *Lion* and *Tiger*, the spray and clouds of smoke from the shell striking, such a mist existed between the heads of the columns that, especially from the British ships, the enemy was invisible. A short battle ensued between Scouting Division II and the First Light Cruiser Squadron from 6.05 to 6.10 at ranges from 11,600 to 14,000, until the latter turned away; but the fire from the British battle cruisers became slower and slower, until the *Lion*, which was least hindered by smoke, owing to her position in the line, ceased fire at 6.12. This ship had suffered the most up to that time. On the southern course, she had sustained 10 major caliber hits alone, some of which were very severe, while the *Tiger*, although struck 16 times, had not sustained such severe damage to her armament. (Narrative of the Battle of Jutland, p. 24; Fighting at Jutland, p. 54.) None of the battle cruisers or battleships, which were being pursued, had sustained any casualties from the German gunfire which affected the speed or handling of the ships. At 6.10, Admiral Beatty was therefor so far out of effective range of the German guns that he could reduce speed to 24 knots and stand on course NNW. to join the Grant Fleet.

In vain Admiral Scheer sought with the utmost speed of his ships and, in particular, of Battle Squadron III, to remain on the heels of the enemy, and therefore turned the divisions two points farther to port at 5.59 on signal from the fleet flagship, in order to hold contact with the British battle cruisers on their course NNW. Only the *Markgraf* continued to fire on the *Tiger* with occasional interruptions after the change of course to NW., and since the enemy was continually drawing ahead, could finally only fire with the forward turret. Fire had to be ceased entirely at 6.25, when the range was 19,000 meters, in order not to endanger the ship ahead. On the other hand, the *Grosser Kurfurst* shifted at 6 from the *Princess Royal* to the *Valiant* with an initial range of 17,400 meters, while the *Konig* shifted from the *Tiger* to the *Barham*, but could only reach this vessel for five minutes with the forward turret and then shifted further to the *Valiant*. At 6.16 the *Grosser Kurfurst* was forced to cease fire against this ship on account of the extreme range [fig. 15].

Meanwhile the British battle cruisers had steamed so far out of the action that, although they were followed at the highest speed by Admiral Hipper, they were beyond the extreme range of the guns of the German battle cruisers. The latter were therefore forced to fire at the Fifth Battle Squadron, which was effectively covering the retirement of the battle cruisers, and in this manner came more and more to bear the brunt of the battle.

At this time the ships of the Fifth Battle Squadron stood out clearly against the golden western horizon, while the German ships were shrouded in the dusk to the eastward, and almost completely disappeared. Only when the sun broke through the cloud banks were the outlines of the German ships visible for a time, while the sun blinded the German gun pointers. Otherwise the German ships could only be located by the flash of their guns. At 6.11 the *Barham*, leading the squadron, received two further major caliber hits, but the farther the head of the column withdrew from the German lines, the more was the fire concentrated on the rear ship—the *Malaya*. Although at 6.27 the *Lutzow* was still firing on the *Barham*, *Derfflinger* on the *Valiant*, and *Seydlitz* on the *Warspite*, the *Von der Tann* had opened on the *Malaya* at 6 p. m. At 6.08 the *Kronprinz* had joined in the fire on the latter ship, followed at 6.10 by the *Kaiser*, and at 6.27 by the *Moltke*. Thus, according to reports from that ship, the *Malaya* lay under continually straddling salvos from 6.05 to 6.30 p. m. Six salvos per minute were usual, and at one time as many as nine salvos struck all around this hard-pressed vessel in quick succession. Although the ship sheered out to port, the Germans remained on the target, and at 6.20 a major-caliber hit at the water line caused a violent shock throughout the hull. Immediately thereafter the splinters of a shell broke the steam lead to the siren, and the rush of escaping steam made all communication with the forward spotting station impossible. At 6.27 a heavy shell struck the after turret and knocked off most of the turret roof. The *Malaya* was about to use the secondary battery to make a splash screen by firing short very near the ship in order to hinder enemy spotting, when two shells, striking one after the other, put the whole starboard 15-cm. (6-inch) battery out of action. Finally, at 6.35, when the guns of the *Malaya* could barely fire at extreme elevation, another major-caliber shell struck at the water line, so that from 6.20 to 6.35 the ship was hit five times with heavy shell. This ship suffered a loss of 63 killed and 68 wounded, while the *Barham* lost 26 killed and 46 wounded, most of the casualties occurring during this phase of the action. While large quantities of oil streamed out of the leaking and burning hull, the ship gradually listed to starboard, but could be kept from capsizing. A similar fate was escaped by the *Warspite* and *Valiant* by the fact that shortly after the opening of this phase of the action they sheered out to port and formed line of bearing in the lee of *Barham*, thus being protected from this fire. Up to 6.40 the ships of the Fifth Battle Squadron had received the following hits while on the northerly course: *Barham*, 4; *Valiant*, 0; *Warspite*, about 5; and *Malaya*, 7.

On the other hand, the fire of the Fifth Battle Squadron had not been entirely ineffective, although only in the first phase of this ac-

tion were they supported by the battle cruisers. The *Barham* and *Valiant* had been firing principally on the German battle cruisers, while the *Warspite* and *Malaya* directed their fire against the leading German battleships. At 6.09 the *Grosser Kurfurst* was struck in the water line, while similar hits were made at 6.10 on the *Markgraf*, at 6.13 on the *Lutzow*, and at 6.19 on the *Derfflinger*. All around these ships surging columns of water were thrown up by the shell while the decks were showered with splinters. Only the *Lutzow* sustained grave injuries from these hits. One shot destroyed both the main and auxiliary radio installations, so that hereafter the important methods of communication between the commander scouting forces and the commander in chief were restricted to searchlight signals. In this phase of the action the *Seydlitz* suffered severe casualties to her battle equipment. Between 6.06 and 6.08 this ship was struck twice near the bow, and at 6.10 a major-caliber shell broke through the protective bulkhead of the second turret and put the right gun out of action. Another shell struck the third turret, which was already jammed, and started a fire among the powder charges similar to that on the *Lion*. The fourth and fifth port 15-cm. guns were put out of action by direct hits, and finally another shell rendered the right gun of the fifth turret unserviceable. A hit on the roof of No. 4 turret did not penetrate. [The Fifth Battle Squadron, unsupported by Beatty, gave a splendid account of themselves in this critical period of the battle. The work of this squadron was probably the most effective of any performed by the Grand Fleet at Jutland.]

On the contrary, the *Moltke* and *Von der Tann* were not hit in this phase of the action, but another casualty took place on the latter ship, which was the second of this nature. The one remaining turret, which was able to fire, was put out of action by the fact that the guns would not return to battery after firing and remained in the "run-in" position. In spite of the loss of the entire main battery, the commanding officer, Captain Zenker, decided to remain in formation in order that his ship should be counted in the enemy fire distribution, and the enemy thereby hindered from concentrating on one of the other ships. Since, however, he was not compelled to hold a constant course to assist the fire of the battery, he was able to avoid further hits by maneuvering his ship; and, although considerably reduced in fighting efficiency, was able to maintain station with Scouting Division I. [A most inspiring example.]

Meanwhile the visibility conditions which had previously been so favorable for the Germans were now reversed. The enemy, who were at this time directly in line with the sinking sun, could barely be made out as the sun shone beneath the clouds. Spotting became impossible, and for a while the German battle cruisers were acting

only as targets, while the distance between them and the Battle Fleet, as well as between the fourth and fifth divisions of the latter, continued to increase, owing to their determined pursuit of the enemy at the utmost speed. The decrease in the visibility conditions and the consequent weakening of the German fire was promptly utilized by Admiral Beatty to gradually envelop the head of the German column by steering north and northeasterly courses with his light forces. When, therefore, Admiral Scheer, at 6.21, ordered Admiral Hipper to continue the pursuit with his forces in order not to let the enemy get out of range, the commander of the scouting forces was just about to report this enveloping movement of the enemy forces, which naturally could not be observed from the fleet flagship far astern.

This message could not be sent because just at that moment the radio installation of the *Lutzow* was put out of action. There remained nothing for Admiral Hipper to do but carry out these orders, and at 6.27 he therefore turned to the northwest with his battle cruisers in spite of the unfavorable conditions in order to make another approach to the enemy at full speed. This movement, however, only facilitated the enemy's enveloping movement, and consequently at 6.39 Admiral Hipper was forced to return to course NE. [Fig. 16. This figure corresponds very closely with the official German charts.] Even Admiral Behncke, on board the *König*, had meanwhile observed that the enemy forces, after forming line of bearing, had gradually hauled around to the northward. With the fifth division, he, therefore, gradually followed this change of course to starboard, while the other divisions performed a similar evolution. Consequently the Battle Fleet was soon in a long-drawn-out column about 7 miles astern of Admiral Hipper's forces, while ahead and to port the squadrons and flotillas of Admiral Beatty were chasing to the northward in the mellow light of the sinking sun to rejoin the Grand Fleet. The first phase of the battle was over, but contact was not completely lost before the German forces had time to reassemble, and, with an approach formation of line of squadrons and the cruisers in a scouting line in advance, to secure the fleet against surprise.

Chapter 11

SKAGERRAK—SECOND PHASE—THE ENGAGEMENT OF THE BATTLE FLEETS

At 6.30 p. m., as the fire of the British battle cruiser fleet on the one hand and the German battle cruisers and ships of Battle Squadron III on the other slowly died away, the British battle fleet, under Admiral Jellicoe, composed of 3 battle squadrons, was steaming in line of divisions in 6 columns about 23 miles to the northward of the *Lion*. After the detachment of the Third Battle Cruiser Squadron, only five new cruisers of the Fourth Light Cruiser Squadron remained available for the line of scouts. (*Calliope*, *Constance*, *Comus*, *Royalist*, and *Caroline*.) Instead of keeping these vessels far in advance of the fleet on a scouting line, Admiral Jellicoe had drawn them in close to the battleship divisions to form an antisubmarine screen and had assigned the older cruisers, *Active*, *Boadicea*, *Blanche*, and *Bellona*, a similar mission on the flanks. With regard to the later difficult deployment of the battle line, this disposition of forces was somewhat questionable, since the very important service of information in advance of the fleet fell to the very old and relatively slow armored cruisers of the First and Second Cruiser Squadrons. In accordance with the original plan, these vessels should have taken station in a line extending about 40 miles, with the guide about 16 miles in advance of the fleet flagship; but they had not reached half of this prescribed interval, as the battleships were steaming at 20 knots, when contact was made with the enemy. [See fig. 4 for the dispositions of the battle fleet with attached cruisers.] Further, owing to the constantly decreasing range of visibility, the scouting line had drawn together so that it covered only 25 miles in length, thus further reducing its effectiveness. Of the Third Battle Cruiser Squadron nothing further had been heard since its detachment, although it had been sent promptly to reinforce the battle cruiser fleet, and at 6.30 had advanced about 21 miles beyond the center of the battle fleet, which should have brought it on the scene of action by that time. As was later determined, this squadron, owing to a considerable error in the reported positions of the different flagships, the *Iron Duke* on the one hand and the *Lion* and *Southampton* on the other, had passed about 18 miles to the eastward of Admiral Beatty's forces; and at 6.40, although in the same latitude as the latter, had not sighted them. Thus, while this ad-

vantageous position which the Third Battle Squadron attained was due entirely to an error and can not be attributed to brilliant leadership. it was later to turn to the very favorable account of the British. Consequently, while the German advance screen was nearing the approaching screen of the Grand Fleet from the NW., they were surprised on the unprotected flank by an attack of Admiral Hood's forces. [Figs. 15 and 16.]

Following the change of course of the German battle cruisers to the northeast, and the simultaneous change of the British battle cruiser fleet to NNE. (6.33), contact was lost for a short time, but was soon thereafter regained. At 6.40 Admiral Beatty was again able to recognize his enemy, and the battle cruisers, which had been relieved for a time by the Fifth Battle Squadron, were able to open fire.

At the same time Admiral Evan Thomas sighted the German battle cruisers, and with the *Barham* and *Valiant* joined in the fire on these vessels, while the *Warspite* and *Malaya* reopened the action against the barely distinguishable leading ships of Squadron III, although this fire was intermittent.

At the same time the First and Third Light Cruiser Squadrons, after having been ordered at 6.27 to regain contact with the German battle cruisers at 14,600 meters and to determine their course, had gradually hauled ahead and to the northward so that Admiral Hipper was obliged to resume course NE. in order to remain outside of torpedo range of these light cruisers. Also, the German main body was forced to change course to north at 6.40 and then to north by east, since this force was slowly being outflanked by the enemy battleships. Owing to the high speed of the fifth division the German line had gradually been drawn out and the distance between ships within the divisions themselves had been greatly increased; thus the leading ships *König* and *Grosser Kurfürst* (Captains Brüninghaus and Goette) found themselves alone with the battle cruisers opposed to the forces of Admiral Beatty, which were outflanking them. While up to this time the latter had stood out in bold relief against the sinking sun, they were now enveloped in the mists, which were spreading rapidly, so that *König* and *Grosser Kurfürst*, from 6.40 and 6.43, respectively, could not find their targets with their main batteries. On the other hand, the *König* seemed to offer a much better target, since from 6.40 many shells struck in her immediate vicinity. At 6.47 it appeared as though this ship, which was far in advance of the vessels following, was being fired on by at least three enemy battleships at the same time. It received its first hit in this phase of the engagement. In order to hold his formation together Admiral Behncke reduced speed at 6.49 to 18 knots, while

at the same time he changed course with the *König* to NNE. Meanwhile, Admiral Scheer had realized the hopelessness of further pursuit of the enemy and the necessity for further strengthening his formation, which was too extended as a result of the signal for "reserve speed." At 6.50 he therefore ordered speed reduced to 15 knots, and with the Squadrons I and II swung into column in the wake of Squadron III. Since at that time it was becoming more and more difficult to make out the situation from the fleet flagship, he made signal "guide ahead," thus giving Admiral Behncke the choice of the battle course.

As a result of the failure of the battleship divisions to keep up, the pressure of the enemy outflanking movement was becoming more and more pronounced against the German battle cruisers, while the *Moltke* and *von der Tann* in particular were beginning to have difficulty in maintaining this high speed, which at times reached 26 knots. The fires had not been cleaned since 4 p. m. and were therefore very dirty, while the crew had had no food since noon and signs of exhaustion were becoming apparent among the firemen and coal passers. Further, the fuel oil lines for the auxiliary oil firing had been choked with sludge, which was stirred up in the tanks, and were, to a large extent, inoperative. Even more serious was the fact that the enemy fire, which would naturally be strengthened by a closer approach, could not be effectively returned owing to the complete reversal of the previous favorable visibility conditions, so that the guns of the battle cruisers were able to get on the target only intermittently and then for very short periods. For example, the *Derfflinger*, according to her gunnery report, did not fire a single shot from 6.42 to 7.16. In order to put an end to this state of affairs, Admiral Hipper made a change of course together to NNW. at 6.47 and at 6.51 a further change to north, in order to close with the enemy quickly, in the hope of bringing his fast flotillas to attack and thereby relieving the pressure on his ships. Of these, Flotilla II was the only one which had reached the assigned position ahead and to starboard of the cruisers. On the other hand, Flotilla IX, which had attacked at 5.30, was still far astern, while Commodore Heinrich and Rear Admiral Boedicker, with their light forces, among which was Flotilla VI, were steaming up to position. From the *Regensburg*, flagship of Commodore Heinrich, nothing was to be seen of the enemy except the flash of gunfire, while the salvos which were splashing all around the cruisers forced the destroyers to sheer out constantly.

But even while the German flotillas were advancing at full speed to take position to attack the still invisible forces of Admiral Beatty which were firing so effectively, the Grand Fleet approached rapidly from the northwest, and before the German forces had the slightest

intimation of the situation the light forces of Admiral Jellicoe and Admiral Beatty had made contact. At 6.33, Rear Admiral Napier, on board the *Falmouth*, which was cruising at the head of the Third Light Cruiser Squadron about 4 miles in advance of the *Lion*, sighted two or three armored cruisers approaching from the northwest. These belonged to the scouting line composed of the vessels of the First and Second Cruiser Squadrons, with the following ships, *Black Prince*, 11 miles to the southward of the western column of battleships, then *Duke of Edinburgh*, *Defense*, *Warrior*, *Minotaur*, and *Shannon* with the *Cochrane* on the eastern flank bearing ENE. from the last column of battleships. These older and slower armored cruisers, which were advanced an insufficient distance ahead of the fleet, were to prove entirely inadequate for their mission as an advance screen. The battle lines advanced rapidly from the southward toward the Grand Fleet and before the leader of the latter could be informed of the situation or receive any reports of the position of his own and enemy forces which were in action, the two fleets had clashed.

The *Black Prince*, being nearer the enemy than the other ships of the Grand Fleet, had at 6.40 p. m., after receipt of a searchlight signal from the *Falmouth*, reported battle cruisers 5 miles to the southward of her position. This was just at the time when Admiral Beatty reopened fire on the German battle cruisers. Although this message referred to Admiral Beatty's forces, for some unexplained reason these were designed in the radio which Admiral Jellicoe received some time later as enemy forces. (The *Black Prince* was later sunk in the night action.) Since the German battle fleet was assumed to be immediately behind their battle cruisers, this message from the *Black Prince* shifted the position of the former some 20 miles to the northwestward of the point they should have reached at that time, in accordance with the previous report of Commodore Goodenough. Admiral Jellicoe therefore reached the correct conclusion that the message from the *Black Prince* must refer to the forces under Admiral Beatty. Nevertheless, this inaccurate message only served to increase the great uncertainty of the British commander in chief, which was caused by the very meager and conflicting reports on the developments of the action, a situation which continued up to the time when it was no longer possible to delay the deployment of forces for battle. Then, while the *Black Prince* turned off to the westward in order to make way for the approaching forces of Admiral Beatty, shell splashed near the next ship in line to the eastward, *Duke of Edinburgh*, while at the same moment gunfire was heard or seen by all ships in the scouting line and also by the ships of the Fourth Light Cruiser Squadron near the battleships. Shortly thereafter, near the western flank of the advance

screen, the battle cruisers of Admiral Beatty appeared engaged in a brisk action, while to the northward of these were the First and Third Light Cruiser Squadrons, surrounded by splashes of shell from the enemy main and secondary batteries. The latter became involved in the midst of the screen of the battle fleet while these were deploying for battle, and therefore Admiral Beatty's signal at 6.50 to this force to attack the enemy van with torpedoes could not be carried out.

Finally the First Light Cruiser Squadron succeeded in breaking through between the fourth and fifth battleship divisions to the northward, thus making room for the other forces, which, with the destroyer flotillas of the battle fleet, were crowded together in the smallest possible space while attempting to take position for the pending attack of the battle fleet. At the same time the Third Light Cruiser Squadron joined forces with the screen of the fleet, the First and Second Cruiser Squadrons, and the Fourth Light Cruiser Squadron, and with these swung to the eastward in order to take station at the head of the battle squadrons on the probable battle course [fig. 17]. While still changing course at 6.47, however, Rear Admiral Sir Robert Arbuthnot, commanding First Cruiser Squadron, sighted from the *Defence* three or four light cruisers about four points to starboard, apparently on course NE. These were the ships of Scouting Division II, which were about 5 miles ahead on the starboard side of the German battle cruisers. The Third Light Cruiser Squadron was passing to the northward when he opened fire with the *Defence* and *Warrior* on the second or third cruiser which was most clearly seen (*Wiesbaden*), and, finding that the first salvos fell short, turned sharply toward the enemy. At the same moment shell struck near these light cruisers from the eastward, while from the westward the forces of Admiral Beatty were approaching in action with the German battle cruisers. At 6.50 even Beatty's ships had reached the fleet screen, and six minutes later he sighted the leading ships of the British battleship columns about 4 miles to the northward of the *Lion*.

Promptly reaching the decision to prevent Admiral Hipper's forces from sighting and reporting the pending deployment of the Grand Fleet, he turned with his battle cruisers sharply from NNE. to course east, and, steaming at full speed, supported by the Fifth Battle Squadron, sought to force the head of the German column around to this course. Consequently, the distance from the German battle cruisers, which were in sight and apparently followed by ships of the *Konig* class, was rapidly reduced from 12,800 to 11,000 meters. But even then the ships of Admiral Beatty's force could not be distinguished by the German forces and only

in the greater effectiveness of the fire was the approach of these ships made evident. At 6.55 the *Derfflinger* was struck by a major-caliber shell in the forward torpedo compartment and rapidly sank deeper in the water, owing to the volume of space flooded, while the entire forward part of the ship had to be cleared and all exits therefrom closed. At the same time several shots striking the *Seydlitz* at 6.57 near the bow caused a fire in the forecastle. The situation therefore became untenable for the German battle cruisers, as they were under heavy fire which they could not return, while now to the northward a large force of destroyers and light cruisers were assembling, apparently ready for torpedo attack. At the same time the head of the German line was lacking in fast flotillas, as these had been drawn off to meet an unexpected attack of a new enemy from the eastward. Admiral Hipper was therefore forced to turn to course east and break off the proposed attack on the enemy battle cruisers at 6.56. Finally, in order to free his ships from the effective fire zone of the enemy, he turned "ships right" at 7.05 to course SW. through south. [Note X, fig. 17.] In this decision he was influenced by still other factors which have been barely indicated. At this time the Third Battle Cruiser Squadron joined in the action from the eastward, an attack which was as much of a surprise to the British as the German leaders.

Admiral Hood had advanced with this squadron about 25 miles ahead of the battle fleet and had sighted no enemy forces, when at 6.27 the light cruiser *Chester*, which was cruising about 5 miles to the westward of the squadron as a scout, heard gunfire to the SW. [Notes D and Z, fig. 15.] From this direction heavy clouds of smoke were drifting toward the British cruisers, so that the range of visibility varied from 13,000 to 5,000 meters, and was at times as low as 2,000 meters. Shortly thereafter gunfire was seen through this smoke cloud, and at 6.36 the indistinct outlines of a cruiser with three stacks was sighted, which accompanied by a group of destroyers was steaming to the northward. In order to protect herself from torpedo fire in case this should not be expected advance screen of Admiral Beatty's forces the *Chester* turned immediately on parallel course, when two further cruisers appeared like phantoms in the mists and the British cruiser was suddenly overwhelmed by a hail of shell. This was Scouting Division II, under Admiral Boedicker, which was cruising about 5 miles to the NE. of the German battle cruisers. He was successful in deceiving the enemy by means of the English recognition signal, which had been made known by radio messages, and approached to within 5,500 meters of the British cruiser, which had suddenly appeared on the visible horizon. Fire was opened only when the vessel turned away. The *Frankfurt*,

flagship, Captain von Trotha, fired first at 6,400 meters, followed by the *Pillau*, *Elbing*, and *Wiesbaden*, as well as by the torpedo boats of Flotilla II to the northwestward and the Twelfth Half Flotilla in the rear. Completely taken by surprise, the *Chester* did not return this fire until after the third salvo, while the fourth salvo put the first gun of the port battery out of action and wounded and killed so many of the crews of the second and third that only the fourth gun could fire. In order not to confuse the spotting the *Elbing* and *Wiesbaden* received orders to cease fire. Meanwhile Admiral Boedicker was pursuing this cruiser at full speed to the NE., and thus ran into the Third Battle Cruiser Squadron. Admiral Hood had just heard the sound of gunfire from the direction of the *Chester*, when at 6.40 he turned his battle cruisers through nine points to starboard and at high speed stood in between the *Chester* and her pursuers, followed by the light cruiser *Canterbury* and four destroyers, which were about 5 miles to the southward of the battle cruisers. [Note E, fig. 16.] At 6.55 he opened fire on the German light cruisers with the battle cruisers *Invincible*, *Inflexible*, and *Indomitable* at a range of 7,300 meters, and continued this rather effective fire until shortly after 7 p. m., when the last German cruiser disappeared in a smoke screen. (In this pursuit he approached his own fleet so rapidly that the *Minotaur* and *Shannon* nearly mistook his vessels for enemy ships and fired on them.) [Note C, fig. 16.]

This heavy-caliber fire from a direction in which up to now no enemy forces had been sighted, reported, or expected was all the more surprising to Scouting Division II and to Admiral Hipper's cruisers and destroyers, since all of Admiral Beatty's forces appeared to be in action to the west and northwest, and, further, these new enemy forces from which the heavy fire was coming were still invisible. Only later were their bow waves visible, and finally, at 6.58, there appeared for a short time the ghostly and shadowlike outlines of the larger ships and accompanying light forces. Admiral Boedicker thought he recognized two cruisers of the "city class" and several battleships or battle cruisers on course NW. The *Elbing* and *Pillau* counted four first-line ships, but whether of the *Malaya*, *Iron Duke*, or *Agincourt* type was doubtful. Were these some of Admiral Beatty's forces which had unexpectedly hauled around so far ahead of the German van; were they new forces just coming on the scene of action; or were they part of the still invisible enemy battle fleet which had joined in the action with the light forces and destroyers? Each question appeared idle. The *Wiesbaden*, Commander Reiss, reported herself incapable of maneuvering and both engines out of commission when new salvos struck near these light cruisers from the north and northwest from an

invisible enemy (from *Tiger*, *Defence*, and *Warrior*). At the same time the German battle cruisers lay to the westward in the midst of heavy fire. There was no room to escape in that direction. The *Frankfurt* therefore turned to the reverse course with hard right rudder and was followed by the other ships of Scouting Division II, with the exception of the *Wiesbaden*. While still turning, the *Frankfurt* and *Elbing* each fired a torpedo against the large ships to the eastward; then they withdrew from the enemy fire in the smoke screen and for a wonder escaped undamaged. [Note Z, fig. 16.] Only the *Pillau*, Commander Mommsen, was struck by a 30.5-cm. (12-inch) shell at 6.58, which penetrated the forward boiler compartment through the smokestack. The oil and coal dust was set on fire, four boilers put out of commission, the chart house and upper and lower bridges fell in ruins, the reserve radio station was destroyed, but the ship could still maintain 24 knots speed and was finally successful in escaping in a smoke screen and rejoining the other cruisers.

While the German light cruisers were in the midst of their evolution in turning away from the enemy, the Twelfth Half Flotilla under Lieutenant Commander Lahs steamed up to attack first on easterly and then on northerly courses. While about to attack the badly damaged *Chester*, the latter group of destroyers had sighted an "enemy detachment of numerous large battleships" on course NW., and, breaking off the attack on the *Chester*, turned to attack this larger force on realizing the dangerous position of Admiral Boedicker's forces. At the same time the British destroyers *Shark*, *Acasta*, *Ophelia*, and *Christopher* were concentrated for attack behind the line of enemy capital ships. The first group, *V–69*, *S–50*, and *V–46*, (Lieutenant Commanders Stecher, Recke, and Krumhaar), approached to within six to seven thousand meters and fired four torpedoes, while torpedoes fired by the enemy destroyers at Scouting Division II passed by these boats. The latter were warned by signal, and as the first group of the Twelfth Half Flotilla then turned away to the westward under heavy fire from the ships attacked, it was unable to observe the results of the shots in the mists and smoke. Of the second group attacking, only the *V–45*, Lieutenant Commander Lassmann, was able to fire on the enemy ships, since the German light cruisers in turning away threatened to cross the line of fire. Therefore the *G–37*, Lieut. Commander Wolf von Trotha, was forced to direct his attack against the enemy destroyers, and fired a torpedo at the latter at a range of from five to six thousand meters. As the boats of the Twelfth Half Flotilla were returning from attack, they encountered Flotilla IX, under Commander Goehle, proceeding to attack with the signal "Z," i. e., the signal for attack. [Notes Z and Y, fig. 17.] Hindered in

this manner by the Twelfth Half Flotilla, only the leader, *V–28* (Lieutenant Commander Lenssen), *S–52* (Lieutenant Commander Ehrentraut), and *S–34* (Lieutenant Commander Andersen), were able to fire torpedoes at about 6,000 meters at the enemy capital ships, these being visible for only a short time. The other boats of this flotilla became involved in fights with the enemy destroyers, which, on account of their size, were frequently mistaken for light cruisers. Thus the *S–36* (Lieut. Commander Franz Fischer) fired torpedoes at 7,500 meters at what appeared to be two light cruisers with four stacks, the leading vessel remaining stopped after the first torpedo was fired; also the flotilla leader [*V–28*] fired at another light cruiser on course SE. at 7.08 at a range of 4,000 meters. Thereupon, Flotilla II, under Commander Schuur, steamed in between the fighting groups.

At the time of the attack of the Third Battle Cruiser Squadron this flotilla was ahead and to port of Scouting Division II at the head of the German column, had fired on the *Chester*, and then had turned away with the cruisers. Thereupon *G–101*, *G–102*, *G–103*, and *G–104*, led by Commander Boest, had followed Flotilla IX to attack. However, the *G–101* and *G–102* had not been able to sight the enemy, as the latter was blanketed by the retreating light cruisers. Only the last two boats, *G–103* and *G–104*, sighted suddenly to the eastward "a squadron of battleships" and turned sharply to attack the van of the enemy column. At this time the returning boats of the Twelfth Half Flotilla masked the target for these boats. A second attack was impossible, since their own battle cruisers were rapidly approaching and they had to make way, so that only the *G–104* was finally able to fire one torpedo at the second enemy ship at 6.55, at from 6,000 to 7,000 meters.

The other boats of Flotilla II, under Commander Schuur, were about to attack when signal was hoisted on the *Regensburg*, flagship of the second leader of destroyers: "Follow the leader." At that time the *Regensburg*, with the leaders of Flotilla VI and Eleventh Half Flotilla, was steaming up to the head of the column. Flotilla II assembled its half flotillas and the boats returning from attack, and joined the *Regensburg*, and pushing through the confined spaces between the battle cruisers and light cruisers of Scouting Divisions I and II, opened fire on one English light cruiser and destroyers which were approaching from ESE. One destroyer was fired on by the *Regensburg* from 7.04 to 7.08 at from 6,800 to 2,600 meters, and was brought to a stop. This destroyer was then taken under gunfire by the leader of Flotilla VI, *G–41*, which was following the *Regensburg*, as long as its guns would bear in passing. Thereafter *G–41* fired on another destroyer which appeared to be stopped at a distance of from 6,000 to 8,000 meters, silencing the fire from the latter

after the first straddling salvo. Since the German battle fleet was now approaching from the westward and this destroyer might still have an opportunity to fire torpedoes at this force, the *G–41* fired a torpedo set for a shallow run which exploded near the stern of the enemy boat. [The destroyer apparently was the *Shark*.] The Eleventh Half Flotilla also participated in this action. Then the *B–97*, of Flotilla II, made several hits with gunfire on this same destroyer, carrying away the center stack, and was about to fire two torpedoes at it when it was hindered by the *Regensburg* crossing the line of fire. The latter was firing at a light cruiser at from 8,000 to 8,400 meters from 7.08 to 7.17 until the enemy turned away and disappeared in the mists. [This was the *Canterbury*.] Meanwhile, on board the *B–98* (Lieut. Commander Theodor Hengstenberg), leader of Flotilla II, the after torpedo tubes were hit while being trained. Both tubes were put out of action and the mast went by the board, so that *B–98* had to join the *Regensburg* after turning away.

The choppy sea resulting from the large number of boats steaming at high speed, the motion of the vessels, and the spray on the telescopic sights made sighting difficult. However, *B–112* (Lieut. Commander August Claussen) fired 82 10.5 cm. (4-inch) shells in a short time against the light cruiser at a range of 7,500 meters and against a destroyer at 4,500 meters, while the *B–110* in the rear of the line was able to fire only two or three salvos, and the other boats were forced to turn away by the approach of their own forces. Further, the group under Boest joined with the "B" boats in the action from 7.05 to 7.20 p. m. At 7.15 the *Frankfurt* sighted a destroyer dead ahead, which was on fire and apparently in a sinking condition (*Shark*), and fired several straddling salvos at a range of 11,300 meters. Another destroyer (*Acasta*) attempted to go alongside but was driven off by German gunfire, while the sinking boat apparently hoisted a white flag, although continuing to fire from one gun. An English light cruiser to the southward was also taken under fire, which had to be ceased shortly on account of poor visibility, while at the same time the *Frankfurt* lay in the midst of a heavy fire.

In the uncertain light, and obscured by mists and smoke clouds, the enemy forces attacking from the eastward appeared to be much stronger than they really were, so that Commodore Heinrich, second leader of destroyers, was under the firm impression that the appearance of the numerous enemy destroyers, light cruisers, and capital ships indicated an attack of the Grand Fleet from this direction. If this were the case it was not only necessary to protect the German battle cruisers from the attack of the destroyers approaching from the eastward but to attack the van of the British battle line with all flotillas at the head of the German line in a massed formation in order to inflict as much damage to these as possible.

while disregarding the enemy forces to the north and northwest. In reality the attacking enemy forces which appeared so powerful in the mist were so small in number that the large number of destroyers only hindered each other without finding adequate targets.

At 7.13 the *Invincible* had to sheer out to starboard, as it appeared to the other ships following, and to stop on account of a torpedo hit. Shortly thereafter the *Inflexible* and *Indomitable* sighted several torpedoes, one of which passed under the former without exploding. Four other torpedoes which were sighted close aboard were running so slowly that it was evident they were at the end of their run and were easily avoided by sheering out with full rudder and high speed. Even the supposed torpedo hit on the *Invincible* had done so little damage, apparently, that the "breakdown" flag was soon hauled down, and the ship resumed her station at the head of the column. Even the *Chester*, with three guns out of action, wrecked boats, and holes in the stacks and hull, as well as the side armor, had her machinery intact—although two boilers were slightly damaged—and was able to escape to the lee of the Third Battle Cruiser Squadron. Thus the total loss to the English in this action was restricted to one destroyer.

This was the *Shark* (Commander Loftus Jones), which had turned to port after the attack on Scouting Division II after firing the forward and after torpedoes. At 7.15 this boat lay in a helpless condition, with fuel-oil lines shot through and steering gear wrecked. The reserve torpedo was about to be loaded when this was struck by a shell which exploded the air flask. Overwhelmed by the fire from the *Regensburg* and the German flotillas, the *Shark* could only return the fire with one gun, when she was struck by a torpedo fired from 4,000 to 6,000 meters and began to sink. The *Acasta* started to the rescue but was struck both fore and aft, while the *Shark* heroically refused all offers of assistance. *The Canterbury*, which, on southerly courses, tried to render aid to the *Shark* and *Acasta* by means of a well-directed torpedo defense fire, was struck by a 10.5 cm. shell, which pierced several bulkheads without exploding, and the vessel was forced to retire.

The extremely small losses of the English at this time were all out of proportion to the tremendous gain which resulted from this surprise attack of the Third Battle Cruiser Squadron on the unprotected flank of the German forces. This is a proof of the tactical advantage possible to a squadron operating singly and not in the fleet formation. Failing the attack of this force, the German torpedo attack, which had already been ordered, would have taken another direction, namely, against the forces of Admiral Beatty, and would in all probability have prevented the latter from completing the enveloping movement of the German van—as was done later

by the British Battle Fleet. In that event there is a possibility that the German battle cruisers and the Third Battle Squadron would have surprised the enemy fleet in the midst of their deployment for battle and would have been able to cap them (cross the "T") instead of later being brought into an untenable tactical position themselves by Beatty's outflanking movement. [This is excellent comment. Hood's forces exerted a powerful effect, which continued throughout the action.]

As at 7 p. m. Admiral Beatty entered between the leading ships of the columns of his own battleships on one side and the German battle cruisers on the other, he was under the impression that Admiral Jellicoe was about to deploy his battle line on the western flank. Only in that case could he take station ahead of the leading column in time to avoid interfering with the evolutions of the fleet, and thus masking its view of the Germans. Thus the sudden change of course of Admiral Beatty to the eastward was hard for Admiral Jellicoe to understand. The only message which he had received from Admiral Beatty since 5.48, "Have sighted enemy battle fleet bearing SE. My position 56° 36′ N., 6° 04′ E.," was, as previously stated, so distorted on receipt by the *Iron Duke* that after deciphering it read, "26 to 30 battleships, probably enemy, bearing SSE., course SE." Further, the commander in chief had received no word regarding the loss of the *Queen Mary* and *Indefatigable*. On the other hand, Commodore Goodenough, the commander of the Second Light Cruiser Squadron, which was in rear of the Fifth Battle Squadron, had sent five very exact reports from the *Southampton* from 5.38 on.

From 5.48 on Admiral Jellicoe knew from these radio messages that the van of the German column comprised vessels of the *Kaiser* class, that the German battle fleet had advanced to the northward to join the battle cruisers, and that the latter were on course north. Further, the changes of course to NNW. and back to north were both reported. These reports were further confirmed by the direction-finding stations on the east coast of England, which "cut in" the position of the German forces after each radio sent by the latter. At the same time the German messages were deciphered at the Admiralty and relayed to Admiral Jellicoe with very little delay. As early as 6 p. m. the latter had received in this manner the position of the German fleet, which was exact within 4 miles, and at 6.53 he was informed by radio from the Admiralty that the German fleet was in 56° 31′ N., 6° 5′ E. at 5.30 p. m., on course north at a speed of 15 knots. Even this reported position was accurate within 3 miles. According to all these reports he should have found the enemy directly ahead. Therefore, as soon as he saw, from the head of column of the Third Battleship Division, that the British battle

cruisers were crossing the course of his columns in action with a still invisible enemy, he sent the following message by searchlight to Admiral Beatty: "Where is the enemy battle fleet?" (7.01). That there had been some misunderstanding somewhere was clear, since Admiral Beatty had come on the scene a great deal farther to the westward than his previously reported position would have indicated. As stated before, this was due to an error in reckoning on the two flagships; thus the calculated position of the *Lion* was about 7 miles to the eastward of the true position, while the error of the *Iron Duke* was 4 miles to the northwest, making a total error of 11 miles. (Corbett: Naval Operations; Vol. III, p. 355.)

After this had been established by the sighting of the battle cruisers, Admiral Jellicoe believed, that in spite of the reports from the coast radio stations which were free from position errors, the German fleet would appear farther to the westward. Consequently, without waiting for an answer to the signal sent to Admiral Beatty, he altered course of his columns to south at 7.02 in order to gain sea room to the westward and to place his fleet directly in line of the probable approach of the German fleet. A few minutes later he was convinced, after a short consideration, that the new course was not advantageous. This new course, south, brought the leading ships of the columns in line of bearing with the western flank far advanced, thus making it very difficult to swing into column on course east. As a result of the sighting of Admiral Beatty's forces it was apparent that the D. R. positions reported contained errors in both latitude and longitude, and therefore the enemy fleet should be sighted about 20 minutes sooner than originally expected. Before the columns could execute this maneuver of changing course and resume the formation of divisions on line of bearing the enemy would have approached within battle range. It therefore appeared of the utmost importance to bring the fleet into formation as soon as possible with the line of bearing of the division guides at right angles to the bearing of the enemy in order to permit the fleet to swing into column in either direction. Therefore Admiral Jellicoe ordered the columns to return to course SE. at 7.06. At this moment he received from Admiral Beatty, who was then passing the western column of battleships about 2 miles to the southward of the *Marlborough*, the message by searchlight, "Enemy battle cruisers bear SE.," neglecting to answer the other question in regard to the position of the enemy battle fleet. This message therefore only added to the existing uncertainty in regard to the situation, since this directly contradicted a report received some 10 minutes before from Commodore Goodenough, from which it was to be assumed that the German battle cruisers were in rear instead of in advance of their own battle fleet. (At 6.50 the *Southampton* had reported "Enemy battle fleet had

changed course to north. Enemy battle cruisers are SW. of the battle fleet.")

In order to clear up this contradiction, there was nothing to do but repeat the message to Admiral Beatty, "Where is the enemy battle fleet?" Since, in the meantime, the German battle cruisers had made a simultaneous change of course away from the *Lion*, the latter had lost all contact with the last German ships, which he had had in sight. Thus the British commander in chief received no answer for the time being, and valuable minutes passed without his being able to receive the information necessary for the deployment of his battle line on the proper course. The general situation was further confused by the fact that Admiral Beatty, in giving the bearing of the enemy in his previous message, had neglected to give their course. At that moment, however, he did not know what had become of these forces.

Between the two lines there now lay the heavy smoke clouds from the hundreds of ships which were steaming at full speed to reach their assigned battle stations. These smoke clouds drifted in the light southwest breeze toward the northeast and there combined with the smoke screen which had been laid down by Scouting Division II, thus forming an impenetrable battle mist which was broken only by the flashes of gunfire, the detonation of shells, and the flames of explosions. On the German side the impression gradually dawned that new enemy forces had joined the engagement, but the German commander in chief was led to believe from the reports of Scouting Division II that the attack might be expected from the east and southeast. On the English side the uncertainty was not quite so great, although the cruisers and destroyer flotillas which were passing the battleship columns left a smoke cloud which screened all view of the enemy forces.

Thus the important service of information which was so necessary for the initial deployment of the fleet had entirely failed on the English side in spite of the large number of vessels available for this mission. The report of Admiral Beatty regarding the location of the German battle cruisers gave then, as before, the only definite information on which to base the estimate of the situation. The first and natural thought of the British commander in chief was to deploy in battle line on the western flank as this column stood nearest the enemy. Since heavy caliber shell were already beginning to strike between the columns of ships, this decision would have meant that the oldest and weakest division of his fleet would be exposed to the concentrated fire of the strongest German ships while in the midst of the evolution, and possibly further exposed to a mass attack from the German destroyer flotillas. Further, the other battleship divisions would be forced to

turn to starboard to form column on the sixth division, and then to turn to port in the wake of that division, thus exposing them to heavy concentrated fire at the turning point before their own gunfire could become effective. Finally the execution of this maneuver would have brought the battle lines well within range of the torpedoes of the German battleships, which, in view of the well-known powerful torpedo armaments of these ships, would, in Admiral Jellicoe's opinion, have been fatal. One must agree with the British commander that such a decision would have brought his fleet into a position the Germans would have very much desired. The second possibility would have been to take the lead with the flagship from the middle column, a maneuver which had often been practiced, but which was rather too complicated to be executed in the moment when they were immediately ahead of the enemy. There remained nothing to do but to form the battle line on the eastern flank, even though in so doing the evolution would at first bring the fleet farther away from the enemy.

At about 7.06, Rear Admiral E. F. A. Gaunt, commander of the fifth division, sent the following signal from his flagship *Colossus:* "Remember the traditions of the glorious 1st of June and avenge Belgium."

As a result of the development of the battle line on the eastern flank, quite some time elapsed before the British battle fleet was able to join the engagement. It was 7.08 before Admiral Jellicoe made the initial preparation for assuming battle formation, by sending two of his destroyer flotillas to the head of the line and the other to the rear; and it was 7.14, or four minutes after he had again asked Admiral Beatty for the position of the enemy fleet, before all doubts were removed regarding the correctness of the procedure of deploying on the eastern flank. At the moment when the *Defence* and *Warrior* passed ahead of the *Lion*, crossing the course of the First Battle Cruiser Squadron, Admiral Beatty sighted the leading ships of the German Battle Squadron III and reported by searchlight signal, "Have sighted enemy Battle Fleet, bearing SSW." Shortly thereafter, the *Lion* and *Tiger* were again engaged in a lively action with the German battle cruisers. On the *Barham* the leading ship of Battle Squadron III was also sighted, bearing SSE. A report could not be made, however, until the message had lost all importance, since at 7.15 Admiral Jerram, on the *King George*, leading the eastern flank division, had received orders from the commander in chief to stand on battle course southeast by east and to take over the leadership of the British van. At the same time the columns swung to port on signal, and forming column followed in the wake of the leading division on the ordered battle course. This evolution was just beginning when the first shell struck

in the vicinity of the fleet flagship. At that time the situation was not entirely clear to the commanders of the battleship divisions. As observed from the leading ships in the column, the following picture was presented: Ahead and to starboard the battle cruisers under Admiral Beatty were in action with enemy forces, which could not be distinguished; ahead of the battleship columns and between these and the enemy were a number of armored cruisers, light cruisers, and destroyers, which were only visible by the flash of gunfire, lying in the midst of a heavy fire and trying to take position on the flank of the fleet while the latter was still in the midst of the evolution [fig. 18]. Their excess speed was too small to permit them to clear the field for the British battleships, the majority of which, being tormented by a well-directed fire, could find no other target than the *Wiesbaden*, which was lying helpless between the lines, and opened fire on that vessel. In this fire, the *Marlborough* lost one of her heavy-caliber guns as a result of an explosion which blew off the muzzle.

Under the poor visibility conditions which prevailed at the time the rear division of the British fleet found itself in a dangerous position on turning into the battle line. Scarcely had Admiral Burney, at the head of the rear (sixth) division, turned to port, in order to follow in the wake of the battle line to the northeast, when straddling salvos struck near the *Agincourt* and *Hercules*, the rear ships of the column, and the water from the splashes was thrown over these ships. This shows the exceedingly dangerous position the fleet would have been in had the deployment been made on the western flank which was already almost within torpedo range of the enemy ships. [Very correct comment.]

"Whatever circumstances may have influenced the battle cruiser fleet to fall back on the battle fleet as they did, the result was very unfortunate. Even the fifth division was not in position to open fire on the enemy, as the battle cruisers stood in between, and when the latter were clear of the battleships, it was very difficult to make out in the smoke of battle whether the ships coming in sight were friend or foe." (Report of Rear Admiral Gaunt: Battle of Jutland Official Dispatches, p. 77.)

Only after the battle cruisers had drawn clear was it possible for the rear ships at least to make out the enemy forces. The sixth division at the rear of the column made out four ships of the *Kaiser* class and four ships of the *Helgoland* class, so that at 7.17, the *Marlborough*, which was leading the division, opened on a ship of the *Kaiser* class at 11,900 meters, but was forced to cease fire after the seventh salvo, at 7.21.

It was a fortunate accident for the English that the Fifth Battle Squadron was able to relieve the rear squadron of the battle

fleet in this critical situation and bear the brunt of the attack, as they did before in the case of the battle cruisers. [A well-deserved tribute to Admiral Evan Thomas.]

At 7.06, as Admiral Evan Thomas sighted the *Marlborough* leading Admiral Burney's division, and a few minutes later the other ships of that division came into view, he believed, as had Admiral Beatty, that the other battleship divisions were to the northwest (as they were not in sight) and that these ships were leading the already developed British battle line. In that event the course which had been prescribed by Admiral Beatty would lead him directly across the course of the sixth division and thus bring him, with the battle cruiser squadrons, at the head of the British line into the position desired. But while he was engaged in action with the German battle cruisers and Battle Squadron III, he sighted the other ships of the battleship columns at 7.19 and then realized as he crossed the course of the sixth division that his first impression had been in error. The British fleet was still in the process of deploying and the deployment had been made on the eastern flank instead of the western. The battle station of this fast Fifth Battle Squadron was then at the head of the first division instead of near the sixth division. But it was impossible to arrive at this station without entirely masking the fleet which had already been hindered in the execution of the maneuver by the battle cruisers. There remained nothing for Admiral Evan Thomas to do but swing out on a wide arc with reduced speed and place himself in rear of the sixth division, contrary to the battle orders. (The battle orders provided that in case the battle line was developed in the direction of Helgoland the Fifth Battle Squadron as well as the battle cruisers were to take battle stations at the head of the line. Only in the event that the line was headed toward their own bases was the Fifth Battle Squadron to take station in rear of the line.) This maneuver he found a difficult problem, owing to the large number of light forces which were between him and the battle cruisers, and which were striving to reach their battle stations, while at the same time the battle lines were drawing together and a new attack was being initiated by the German battle cruisers.

At 7.05 the German battle cruisers had executed ships right to course south, while from the *Von der Tann*, which stood nearest the enemy, four enemy battle cruisers and four battleships could be made out to starboard. [Note X, fig. 17.] These were the First and Second Battle Cruiser Squadrons and the Fifth Battle Squadron. By this time such a large volume of water had entered the *Seydlitz* that it had reached the second deck in the forward compartments, and, the forward part of the vessel having lost all buoy-

ancy, it gradually listed over to starboard. While shells were striking all around Admiral Hipper's forces from both sides, Rear Admiral Boedicker reported, as a result of the attack of the Third Battle Cruiser Squadron, that enemy battleships had been sighted to the eastward, and that the *Wiesbaden* had remained disabled in that vicinity. [This completely incorrect information had a very unfavorable influence on the conduct of the action by Admiral Scheer.] At the same time he asked Commodore Heinrich to dispatch destroyers to the damaged cruiser in order to take her in tow. He had already given up hope that this would succeed, on receiving a radio from the Admiral Hipper through the *Derfflinger* at 7.17 that Scouting Division I would have to turn away from the enemy, when the latter, led by the *Lutzow*, made another turn and advanced at high speed toward the *Wiesbaden*. [Fig. 18, Note Z.] At this time, as was also observed from the *Konig*, a large number of enemy light cruisers and destroyers approached the *Wiesbaden*. Even the enemy capital ships maintained a heavy fire on this light cruiser, which was so valiantly defending herself. In order to relieve the pressure on that vessel and on the battle cruisers, Admiral Behncke turned towards the enemy two points with Squadron III with increased speed at 7.15. In this he was followed by Admiral Scheer on the *Friedrich der Grosse* and Squadron I at 7.18 in order to bring the *Wiesbaden* behind their own lines if possible.

At the same time the Third and Fourth Light Cruiser Squadrons advanced from behind the line of armored cruisers, *Black Prince*, *Defence*, and *Warrior*, in what appeared to be a very bold torpedo attack on the German head of column, and opened fire on the *Wiesbaden*. In this attack the *Falmouth* fired a torpedo at the *Wiesbaden* at a range of 4,600 meters. The British light cruisers were, however, so intensely engaged with the *Wiesbaden* that they did not even turn away under the hot torpedo defense fire from the German Battle Squadron III, so that the unfortunate cruiser became the focus of a lively battle, which raged ahead of the still invisible British battle fleet. At this time the destroyer *Onslow* proceeded to attack. This boat had participated in the attack with the *Moresby* on the German battle cruisers about an hour earlier, which had been defeated by Scouting Division II, and since that time had taken station to starboard ahead of the *Lion*. At 7.05 the *Wiesbaden* had been sighted about 5,500 meters ahead of the First Battle Cruiser Squadron. Since the former appeared to be in a favorable position to fire torpedoes at the English battle cruisers, the *Onslow* fired 58 salvoes at this ship at ranges from 3,600 to 1,800 meters: then, since the German battle cruisers had at that time headed for the *Wiesbaden*, the destroyer suddenly found herself in a favorable position for torpedo fire against these forces. When the

latter had approached to within 7,300 meters, the commanding officer, Lieutenant Commander Tovey, ordered all torpedoes to be fired. But the first torpedo had scarcely left the tube, directed at the middle battle cruiser, when the *Onslow* was struck by two shells from the secondary battery of the *Lutzow*, while the escaping steam completely enveloped both torpedo tubes. The danger to the *Lutzow* had still not been allayed, since at this time the destroyer *Acasta*, Lieutenant Commander Barron, which had been with the Third Battle Cruiser Squadron, proceeded to attack.

This boat had just left the destroyer *Shark* under heavy gunfire, when owing to the new advance of Admiral Hipper, she suddenly found herself in a favorable position for attack on the flagship of the latter forces. Although in turning to attack he was met with a rain of shell from the secondary batteries of the German ships he was still able to fire a torpedo at the *Lutzow* at a range of 4,000 meters. Even this time the zeal and determination which characterized the British destroyers in attack was not rewarded [that is, when they were allowed to get into the fight by their superiors], and the *Lutzow* was not hit, while the destroyer turned away enveloped in smoke with damaged steering gear and broken steam lines so that she could neither stop nor steer, until 7.30 p. m. Meanwhile Lieut. Commander Tovey, commanding the *Onslow*, had learned that contrary to his orders only one torpedo had been fired at the battle cruisers, whereupon he proceeded to within 3,200 meters of the *Wiesbaden* and fired another torpedo which struck the cruiser under the bridge but still did not cause the latter to sink. Scarcely had this shot been fired when there offered a very much better target for the two remaining torpedoes. About 5 miles away a long line of battle ships were sighted through the battle smoke which proved to be Battle Squadron III approaching at high speed. Although one fire room was out of commission on the *Onslow* and the engines were only capable of 10 knots, Lieut. Commander Tovey again proceeded to attack although he could count with certainty on the complete destruction of his boat, and fired his last two torpedoes at the battleships. One of these was sighted by the *Kaiser* at 7.25, and since it was running on the surface was easily avoided. [Fig. 18 for *Onslow's* position.] The destroyer escaped. The attention of the ships of the battle fleet was concentrated on other developments of greater importance.

At 7.05 the armored cruisers *Defence*, *Warrior*, and probably *Black Prince* had opened fire on the *Wiesbaden;* then at 7.15 they crossed the course of the battle cruisers directly ahead of the *Lion*, causing the latter ship to sheer out. If Admiral Arbuthnot had expected to find the destruction of the *Wiesbaden* an easy task, he was to pay dearly for his error, since at this time the outlines of

the German battle cruisers and the battleships of Squadron III appeared from the southwest through the smoke of battle. From the *Lutzow* there was suddenly sighted at close range the outlines of a cruiser with four stacks in the lee of the barely discernible First Battle Cruiser Squadron. At first this was thought to be the *Rostock* since it seemed highly improbable that such old armored cruisers would approach so close to the German first line ships. However the commanding officer, Captain Harder, was certain that he had an English ship ahead of him, and opened fire at 7.16 while the *Derfflinger* still hesitated. At 7,000 meters he also fired a torpedo at this enemy cruiser, whereupon the *Grosser Kurfurst*, *Markgraf*, *Kronprinz*, and *Kaiser* joined in the fire. [Notes D and F, fig. 18.] Admiral Arbuthnot realized the danger of his position too late. At 7.20 all three [the *Black Prince* was probably not in this column] armored cruisers lay in the midst of concentrated and extremely hot fire. Salvo after salvo struck these ships in the shortest possible time, while observers on the Fifth Battle Squadron saw the German secondary batteries lay barrage fire at a definite range from the German ships. At this moment the *Defence* was completely covered with the splashes, while aft and then forward tremendous flames broke out of the turrets and the third catastrophe of this nature occurred, a misfortune in this battle which was restricted to English ships. The *Defence* blew up in a crater of flame with an explosion which was heard by both fleets. Where a ship had been before there remained nothing but a cloud of smoke over the water, while no survivor escaped to testify to the disaster. The hard-pressed *Black Prince* and *Warrior* were only barely able to escape a similar catastrophe. A severe explosion occurred near the stern of the latter ship which enveloped the whole ship in a large smoke cloud under the protection of which the armored cruisers were able to escape to the lee of the Fifth Battle Squadron, since at this moment a breakdown of the steering gear caused the *Warspite* to sheer out toward the enemy, thus covering the *Warrior* from further enemy fire and assisting that vessel to escape.

As Admiral Evan Thomas swung in astern of the sixth division with the Fifth Battle Squadron he came under the fire of the German Sixth Battleship Division, although at the time the German fire was rather uncertain on account of the poor visibility. In this fire the *Kaiserin*, Captain Sievers, firing at ranges from 11,000 to 11,500 meters, made a hit on the *Warspite* which indirectly caused a breakdown of the steering gear of that battleship at 7.17 p. m. [Note E, fig. 18.] In making a turn to port the *Warspite* had come too close to the *Valiant* and was trying to turn to starboard when the rudder jammed as a result of the hit and the ship, barely missing the stern of the ship ahead, sheered out toward the German Battle

Squadron III. All efforts to bring the ship back into line were in vain, so the commanding officer decided to swing around in the circle at full speed and thus attempt to get back to his station. But even this maneuver was only successful after the ship had described two complete circles toward the enemy. However—luck in misfortune—the sheering out of this ship saved the *Warrior* from annihilation since the latter was thereby screened from the enemy fire. This battleship thereby drew on herself the concentrated fire of a large number of German ships which had only then been able to find a target. At 7.20 the fleet flagship *Friedrich der Grosse* opened fire on this ship, followed at 7.22 by *Konig*, at 7.24 by *Helgoland*, and immediately thereafter by *Ostfriesland* and *Thuringen* at ranges of from 8,800 to 14,000 meters, with combined main and secondary batteries, while passing on course northeast. Since, however, Battle Squadron III shortly thereafter was forced by the developments of the battle to change course to east-northeast and then to east the *Warspite* was lost to view of the *Konig* at 7.26 and fire ceased. After 20 salvos the *Thuringen* shifted fire to the next ship to the right (*Malaya*) and at 7.35 the *Friedrich der Grosse* and *Helgoland* lost the target, while the *Nassau* followed three minutes later by the *Oldenburg* took up the fire on the *Warspite* at a range of 14,000 meters. Only the *Ostfriesland* was able to continue the fire until 7.45 on this English ship, from which the flames were seen to be spurting after the fourth salvo; in the gathering twilight and smoke clouds the ship could barely be distinguished, so that the fire, at ranges from 13,000 to 16,000 meters, was slow and interrupted. Finally, when the firing director sights as well as the range finders and turret sights lost the target, fire was ceased, the high relative humidity having caused the lenses to fog and thereby limited the gunfire. Owing to these circumstances the *Warspite* was able to escape to the northward from the fire of the German ships, although hit 11 times, and able to return only a weak fire. An attempt to resume station in the line astern of the *Malaya* after putting another steering station in commission had to be abandoned when it was found that water had penetrated the machinery spaces through the badly shot-up hull when speed was increased over 16 knots. Therefore, the commanding officer, Capt. E. M. Phillpotts, was ordered to leave the formation and return with his ship to Rosyth.

On the other hand, the remaining ships of the Fifth Battle Squadron had suffered very little under the German fire after swinging in astern of the sixth division. A number of heavy caliber salvos had passed close aboard these ships, but aside from the *Warspite* only the *Valiant* was hit and then only by 15 cm. (6-inch) shell which struck the side armor and smokestacks. The major

caliber hits which the other vessels had received all occurred during the German pursuit to the northward; thus the *Barham* had 6 hits, *Valiant* 1, *Malaya* 7—3 from the battle cruisers and 4 from battleships. (Battle of Jutland, Official Dispatches, page 194.) After swinging into line in the wake of the *Agincourt*, the Fifth Battle Squadron opened fire at 7.30 partly on the German Squadrons I and III and partly on the *Wiesbaden*.

Meanwhile Admiral Jellicoe had not failed to perceive the disadvantages of the deployment of the battle line on the eastern flank which was leading the battleships away from the enemy, since the battleship squadrons were thereby hindered from joining in the action which the First and Second Battle Cruiser Squadrons, the Fifth Battle Squadron, and the armored cruisers were carrying on. The First and Second Battle Cruiser Squadrons had scarcely passed the fleet flagship and their smoke cleared from the scene when Admiral Jellicoe was able to make out a number of the German ships outlined against the sinking sun as these steamed on a slightly convergent course to the eastward in action with the British cruisers. At 7.24 and 7.27 he received further reports of the location of the enemy Battle Fleet from the *Southampton* and *Lion* respectively. With a fast division at the head and rear of his nearly deployed battle line there was now offered the possibility of approaching within effective gun range of the enemy and bringing his full superiority to bear on the latter, ship against ship. At 7.29 he therefore ordered a change of course from SE. by E. to SSE. for his ships in order to make a sharp approach on the enemy. But a short reconsideration served to convince him that this signal must be annulled. The necessity for reducing speed in order to permit Admiral Beatty's forces to pass clear, had seriously hindered the already very much delayed deployment of his battle line. Behind the fleet flagship, several detachments had had to stop and sheer out owing to the congestion of the line, thus greatly hindering each other, while the rear division at 12 knots had not yet reached the turning point of the column. Instead of the battle squadrons being in a long, straight line, there was a highly undesirable elbow in the column; and owing to the rigid tactics of the British fleet, it did not seem possible for the commander in chief to turn his divisions out of this formation to the desired course of SSE. Admiral Beatty had passed the rear squadrons at 26 knots, and masking the other ships, approached the head of the column at such a sharp angle that Admiral Jerram on the leading ship, *King George V*, was forced to sheer out to port to make way for him, thus bringing his squadron further away from the enemy. Nothing remained for Admiral Jellicoe but to hold his previous course and at 7.33 the battle cruisers were far enough in the lead to permit the

battle fleet to resume 17 knots speed. Therefore, it had not joined the engagement without considerable delay and it was 7.25 before it could exert any effective strength. The reasons for this lay in the fact that the German forces had clashed with the fleet screen on an unexpected bearing, thus making the deployment of the fleet on the eastern flank unavoidable, and this in turn brought about a situation where Admiral Beatty had no other recourse than to steam as he did along the entire British line, between the latter and the enemy, in order to take his station at the head of the column.

Disagreeable as was the necessity for holding this course, this maneuver was to prove very advantageous to the English in the further development of the battle. At 7.20 the Third Battle Cruiser Squadron under Admiral Hood was approaching Beatty's forces from the eastward in order to carry out the orders of the latter to take station ahead of the battle line, while Admiral Beatty changed course to east and at 7.26 to ESE. to join forces with the Third Battle Cruiser Squadron. While the German ships at this time were engaged in action against the *Defence*, *Warrior*, and *Black Prince*, and their attention was concentrated on saving the *Wiesbaden*, a new fast and powerful force was being concentrated ahead of the German line which was not realized by the latter. This force was shortly to bring the German line into an untenable position since the head of the column was entirely divested of destroyer flotillas.

The fire effectiveness of the First and Second Battle Cruiser Squadrons remained small even after the passing of the *Warrior* and *Defence*, which had somewhat blanketed their fire. In particular the *Lion* seemed to be able to join in the action with greatly reduced gunfire, on account of the hits sustained, while the *Princess Royal* had been struck by a salvo passing over the *Warrior* at 7.22 which had put one turret out of action and penetrated the ship's side in the wake of the after machinery space. This ship apparently fired only two salvos therefore from 7.20 to 7.35, while from 7.21 to 7.29 the *Tiger* and *New Zealand* fired 7 and 11 salvos, respectively. Therefore, the junction of the Third Battle Cruiser Squadron with Admiral Beatty's force at this time was all the more advantageous. The German battle cruisers and Battle Squadron III were still on course northeast, when, shortly after the sinking of the *Defence* they encountered an effective and well-directed fire from the north-northeast at a distance of about 10,000 to 11,000 meters. With regard to the previous developments of the battle, this force was at first assumed to be a new detachment of enemy battleships. This fire was so effective that the *Moltke* believed it to come from 8 or 10 ships of the *Malaya* or *Iron Duke* class. In reality this was the Third Battle Cruiser Squadron under Admiral Hood, which at this time had suddenly sighted the *Lutzow* and then the other ships of

the German battle cruiser and battleship squadrons. Crossing the course of these ships at 7.20 they delivered a raking fire from ahead and passing between the British Third and Fourth Light Cruiser Squadrons, executed a brilliant maneuver at 7.22 which placed these ships about 2 miles ahead of the British battle fleet. [A well-deserved tribute to Admiral Hood.] Steaming at the head of this column they then renewed the action against the German battle cruisers with the starboard battery.

This maneuver was the initiation of the sudden fire superiority against the German head of column which in a few minutes was to reach the height of its effectiveness during the battle, since at this time the British battle fleet was commencing its attack. The van of the English battle line was still blanketed by the smoke of gunfire and from the stacks of Admiral Beatty's forces when, at 7.24, the *Agincourt*, the rear ship of the line, sighted the German battle cruisers and opened fire on them, followed by the *Bellerophon* from the middle of the line, while the *Conqueror* opened fire on a ship of the *König* class. One minute later the *Thunderer*, eighth ship in line and directly ahead of the fleet flagship, sighted four enemy ships, battlecruisers and ships of the *König* class, but could not open fire on account of being blanketed by the ship ahead, since at the time the battle line was elbowed. At the same time the Third Light Cruiser Squadron, which was now in advance of Admiral Beatty's forces, sighted the *Lutzow* and *Derfflinger*. These cruisers, together with the destroyer *Ophelia*, which had returned to the *Invincible* after the first attack, joined in an attack on the German battle cruisers, and from 7.25 to 7.29 the *Falmouth*, *Yarmouth*, and *Ophelia* fired torpedoes at ranges of from 5,400 to 7,300 meters. While this attack was being countered with the rapid fire of the secondary batteries of the leading German ships, the ships of the *Lutzow* class and *König* class were fired on at 7.30 by the *Hercules*, *Colossus*, *Benbow*, and *Iron Duke*. At 7.31 the *Conqueror* joined in this fire on the *König* followed at 7.32 by the *Orion*, then *Monarch*, *Thunderer*, *Royal Oak*, and *Revenge*. Although most of the splashes disappeared in the smoke clouds and the poor visibility permitted the ships to fire only from 4 to 8 salvos, at ranges of 10,000 to 12,000 meters, the fire proved very effective. In this the British fleet flagship was very lucky. Scarcely was the field clear after the passing of Admiral Beatty's forces when this ship opened fire on the leading ship of Squadron III, which was just coming in sight (*König*). At that moment the rays of the sun, which was bearing N. 54° W. brilliantly illuminated the ship, so that the *Iron Duke* was able to fire 9 salvos (43 shots) in 4 minutes and 15 seconds, without being seen or fired on by the enemy ships. This fire ceased when the German head of column disappeared in the mists.

Ahead of the German column, extending from northeast to northwest, nothing could be seen but the flash of gunfire from an unbroken line of enemy ships, while all around, salvo after salvo struck in the immediate vicinity. The situation appeared all the more grave, as the fire could not be effectively returned since none of the British capital ships were distinguishable in the smoke of battle. The *Lutzow* and *König* in particular, lay in the midst of a very heavy fire, so much so that it appeared as though several ships were concentrating on these two flagships. From 7.26 on the *Lutzow* was struck time after time near the bow, while from 7.32 on the *König* was also hit frequently. Fire broke out in the fore part of this vessel from the shell penetrating the forecastle, while splinters and clouds of gas enveloped the bridge as the ship heeled over 4½° to port after a severe concussion. At this moment the first leader of destroyers, Commodore Michelsen, who, with the *Rostock*, Flotilla III (seven boats), and the First Half Flotilla (four boats) had been steaming to starboard ahead of the Battle Squadron III waiting to attain a favorable position for attack since 6.45 p. m., now realized that the proper moment had come. [Note X, fig. 18.] As a matter of fact, an energetic attack with full force at this time must relieve the head of the German column. However, the enemy was still so barely discernible, that the commander of Flotilla III asked Commodore Michelsen in which bearing the attack should be developed. He had scarcely passed through the line between the *Rostock* and the battle cruisers, in order to carry out these orders and transmit them to the boats, when turning off to starboard to fire three torpedoes, he suddenly sighted through the smoke clouds the faint outlines of enemy capital ships at a distance of about 6,500 meters. Since the flotilla would hardly be met with an energetic torpedo defense fire at this range the commander decided to make a closer approach. At this moment, however, he received a radio from Commodore Michelsen not to attack, and in spite of the fact that the very favorable opportunity for attack could not be seen from the flagship, he broke off the attack and returned to the *Rostock*. (The reason for the signal to break off this attack is given later.) In turning away, however, the *G–88* (Lieutenant Commander Scabell), the *V–73* (Lieutenant Commander Delbruck), and probably the *V–48* (Lieutenant Commander Eckoldt) which had not received the last order, fired one torpedo each, which must have passed close astern of the First and Second Battle Cruiser Squadrons and reached the head of the British battle fleet column, since at 7.47, the armored cruiser *Duke of Edinburgh*, which was immediately ahead of the line, was forced to sheer out from a torpedo which was attributed to a submarine. At the same time the *King George V* sighted a torpedo directly ahead of the

ship distant about 3,600 meters away. Meanwhile another danger than the unfortunately abandoned torpedo attack confronted the Third Battle Cruiser Squadron.

At 7.30 the smoke clouds parted for a short time so that the Germans were able to see the *Invincible* clearly outlined against the black smoke and powder clouds which still shrouded the other British ships: whereupon the *Lutzow* and *Derfflinger* concentrated fire on this ship which had just become visible. Although hit several times, this battle cruiser returned the fire with such good effect that Admiral Hood called out from the bridge through voice tube to his gunnery officer, Commander Dannreuther, "Your fire is very good, keep it up as fast as you can—every shot is a hit." But immediately thereafter his flagship met her fate. With the second salvo, the *Lutzow*, with fire directed from the after station by Lieut. Commander Gustav Bode, had straddled her target, and as the time of flight gongs sounded for the impact of the third salvo the same catastrophe overtook the enemy ship which had already befallen the *Indefatigable*, *Queen Mary*, and *Defence*. At 7.33 the third salvo of the *Lutzow* struck the British battle cruiser between the two center turrets, penetrated the armor, and exploded inside, so that the turret roofs were hurled high in the air and the ammunition below exploded. Flames broke out all over the ship and a tremendous explosion was heard by both the German and British ships. In the place in which the *Invincible* was formerly seen nothing remained but a mass of wreckage and a smoke cloud which rose several hundred meters above the water. Thus the mother of all battle cruisers had gone the way of the two others. (N. B. Corbett: Naval Operations, Vol. III, p. 366. The *Invincible* was the first ship of this class.) [Von Hase claims the *Invincible* for his ship, the *Derfflinger*.]

As the *Inflexible* and *Indomitable* sheered out to avoid the wreck of the *Invincible* they noticed that the bow and stern of the ship appeared to be widely separated, with each part resting on the bottom in the shallow water, while a group of six men, including the gunnery officer, managed to escape on a raft. These were rescued by the destroyer *Badger* of the First Flotilla on orders from Admiral Beatty. Admiral Hood, worthy of the best traditions of his forefathers, had paid with his death for his part in the brilliant operations he conducted in the opening phase of the battle. Four minutes later a heavy caliber shell struck the conning tower of the *König*. The shot glanced off and detonated about 50 meters from the ship, whereby the commander of Battle Squadron III, Rear Admiral Behncke, who was on the bridge, was wounded, but still retained command of his squadron.

Chapter 12

SKAGERRAK—THIRD PHASE—FROM 7.30 P. M. TO NIGHTFALL

The explosion which caused the loss of the *Invincible* brought to an end one phase of the battle in which the English losses had far exceeded the German, in spite of the fact that the British battle fleet had joined in the engagement. Favored by the surprise attack of the *Invincible* on the unprotected German flank, as well as the decrease in range of visibility experienced by the German ships, the British fleet had obtained a tactically superior position. In this the British were helped considerably by the attempt of the Germans to maintain contact with the enemy forces once this had been established, a desire which may be readily understood considering the long period in which the fleet had been held back from offensive operations. Had the German commander in chief and his subordinates been less eager to close with the enemy which they had sighted, the presumption that additional strong enemy forces might be encountered to the northward would have then induced the commander in chief to undertake a somewhat less energetic pursuit of the British battle cruiser fleet, to seize the opportunity to consolidate his formation and bring his divisions into "approach formation" (with the division leaders on line of bearing about NE.-SW.), proceeding to the northward at reduced speed, with well-advanced screen in scouting line, and prepared to swing into battle line at the proper moment across the bearing of the British battle fleet. In that event the head of the German column would not have run, as it did, into the ring of battleships which was forming to the northward without being strongly supported by the divisions which were in the rear of the formation. (Comment in the War Diary of the *Kaiser*, Captain Count von Keyserlingk.)

As a matter of fact the question was raised on the fleet flagship during the pursuit of the battle cruisers, as to how long the pursuit should be continued, in view of the time which had elapsed, since the advance into the Skagerrak was now a dead issue and the contact with the enemy forces had already been achieved. If the pursuit were continued too long there was the danger that the English light forces might not be shaken off before dark and thus be given opportunity for night torpedo attacks, which might result in losses to the battle fleet. After the sighting of the British battle cruiser fleet there was not much doubt that the British battle fleet

was somewhere in the vicinity, while if this were the case everything depended on the German fleet being able to meet them with full strength should the enemy offer battle the next morning. These considerations had, however, led to no decision when the fleet clashed with ships which could only be vessels comprising the screen of the Grand Fleet. Admiral Scheer thereupon held to the firm decision to fight the pending battle on his previous battle course with his full strength.

While the *Friedrich der Grosse* with the *Kaiserin* and ships of Squadron I were firing on the *Warspite* and Squadron III was firing on the *Defense*, *Warrior*, and *Black Prince*, the enemy fire on the head of the column was increasing in intensity without the majority of the German ships being in a position to join in the engagement. Only the *Prinzregent* was able, at 7.15, to fire at ranges of from 17,200 to 16,000 meters at a ship in the English battleship column (*King George V* class). Meanwhile, as could be observed from the *Friedrich der Grosse*, the *König* was exposed to very heavy enemy fire, while the line ahead of the fleet flagship had taken a decided curve, due to the noticeable outflanking movement of the enemy forces.

This resulted in a tactical formation very unfavorable for effective gunnery and further prevented Flotilla II, which was near this part of the line, from effecting their deployment. Nothing could be seen from the flagship at the time of the German battle cruisers, which were steaming somewhat in advance of the column. In reality these ships, which had borne the brunt of the battle for three hours, had turned away from the enemy line by a simultaneous change of course to SE. at 7.26, since the hostile enveloping movement was accompanied by very heavy gunfire and numerous torpedo shots directed against the head of column. [In fig. 18 Scouting Division I should be in line rather than column.] At the same time Admiral Scheer received a radio from Flotilla V stating that, according to information obtained from prisoners rescued from the destroyer *Nomad*, there were 60 large enemy ships in the vicinity, among which were 20 new battleships and 6 battle cruisers. This report was soon verified when the van of the German column was surrounded on both sides by an unbroken line of ships, from which the flash of gunfire was observed. If the German fleet were held on course east, then the turning point of the fleet would be under the concentrated fire of the enemy line, which, as indicated by the gunfire now discernible, was gradually hauling past that point, thus putting the German fleet in a tactically inferior position. Meanwhile the wind had hauled around from WNW. to W., and then further to the left, so that the smoke clouds from the German ships passed over the leading ships of the line and then toward the enemy, obscuring the

latter, while the German ships stood out in the light background in bold relief against the sinking sun. For this reason, even though it were possible to pass the knuckle without serious loss, a running engagement on southerly course with the enemy fleet to the eastward could only prove very unfavorable from a gunnery standpoint. It seemed then to the German commander in chief that there was only one possibility of extracting himself from this situation; that was to turn his ships to the reverse course in order to give the ships at the head of the line and the accompanying destroyers a breathing spell, and then to renew the engagement from a more favorable tactical position. Between the decision and the execution of the maneuver the situation had become still worse.

At 7.36 the *König* was already on course south, following the movements of the battle cruisers. The rest of the ships of the fifth division were turning on course SE., while the rest of Squadron III were on course east and Squadron I was steering NE. The exemplary training in tactical maneuvers which the German fleet had received on the foundation laid by Grand Admiral von Koester gave Admiral Scheer confidence in the fact that the proposed maneuver could be executed without difficulty in spite of the elbow in the line and the heavy enemy fire. This confidence in his unit commanders and commanding officers was not misplaced. (In the English accounts—Jellicoe, The Grand Fleet, 1914–1916, p. 404, and Corbett, Naval Operations, Vol. III, p. 369—there is the tendency to represent that this maneuver, which was twice repeated with accompanying smoke screens and destroyer attacks, was one which was done with forethought and frequently practiced by the German fleet. It was supposed to be the maneuver by which, in any engagement with the British fleet, the Germans could escape from the enemy superiority as quickly as possible by renouncing their own effective fire during that period. Thus, the turn of ships right (left) on to reverse course was represented as being the general policy of the German fleet where a battle was pending. In reality the German battle plan was no other than the English; i. e., to advance in "approach formation," well extended, and swing the squadrons into battle line on contact with the enemy so that all broadside guns might be brought to bear on all ships at the same time and if possible from a tactically superior position. This was not possible in the foregoing case for reasons previously given, and Admiral Scheer had the sudden inspiration to make use of this simultaneous change of course as one of the many maneuvers in which the fleet had been exercised to meet the changing conditions in the course of an action. This was not done to break off the engagement, but to shift the fleet as quickly as possible in such a manner

that the engagement might be renewed from a more favorable tactical position.)

At 7.33 p. m., after the *Invincible* had been blown up, Admiral Scheer gave the following signal from the *Friedrich der Grosse:* "Turn together to the right to the reverse course." [Literally, "Battle turn about to starboard," i. e., "ships right about."] In accordance with the prescribed methods for the execution of this maneuver, Admiral Mauve, with Squadron II, should have initiated the turning movement, while the rear ship of Squadron I, the *Westfalen*, Captain Redlich, should have turned only after Squadron II had completed the maneuver. Since Squadron II had, however, not yet reached the general battle course of the fleet and was still steering a northerly course on account of the high speed and changes of course, Captain Redlich started the maneuver by turning the *Westfalen*, and, since the signal for course west was flying from the flagship, he took over the lead of the column on this course at 7.39. In the execution of this maneuver Squadron II was screened from the enemy by Squadron I, and the first intention of Rear Admiral Mauve was to swing into the rear of the column astern of Squadron III, but he decided against this, as it would then have interfered with the movements of the battle cruisers and flotillas which were then at the rear of the column. In making this change to course west the *Westfalen* brought the column into a straighter line than would otherwise have been the case. This corresponded to the wishes of the commander in chief, since, had the maneuver been executed as prescribed originally, the head of the column would have been still farther away from the enemy fleet, which was to the northward. While Rear Admiral Mauve was bringing his ships into position to close in the wake of Squadron I by increase in speed and on line of bearing, the ships of Squadron I had followed the turn of the *Westfalen* and were on course west within a few minutes. During this maneuver the fire on the *Warspite*, which had continued up to that time, had to be broken off. After the turn only the *Ostfriesland* was able to fire two salvos at that ship and then had to cease fire as the range increased from 12,500 to 16,000 meters. Before the *Warspite* finally disappeared in the mists she appeared to be steering a westerly course, and this fact created the impression on Vice Admiral Ehrhardt Schmidt, commander Squadron I, that the whole enemy fleet had also turned on the reverse course in order to follow the movements of the Germans. This observation was also made by Captain Heufer on the *Prinzregent*. That ship was also forced to cease fire after making the turn following the fleet flagship, as was the *Kaiserin*, when about 3,000 meters south of the *Wiesbaden*, after firing since 7.15 at a ship of the *King George V* class. After the turn the ships of the fifth division were in the midst

of as heavy a fire as before the turn, while the *König*, with her radio station out of action, did not receive the signal for this maneuver When it was reported at 7.40 that the rear ship of Squadron I had turned and was flying the signal "course west," which was repeated by the other ships astern of the *König*, this ship also made the turn, and with increased speed closed up on the ships of the fifth division. In the execution of the maneuver the *Markgraf* was forced to stop one engine, since the bearings had run warm, and was able to resume station in formation only after extraordinary efforts. On the whole, this dangerous and difficult maneuver was completed by 7.45 without accident, thanks to the superb seamanship displayed by the commanding officers and the thorough training of the fleet.

On the battle cruisers the signal for change of course was received sooner than on the *König*, and at 7.38 the *Von der Tann* had turned to port through east to north, while the *Moltke*, *Seydlitz*, and *Derfflinger* turned to starboard in order to resume the reverse course astern of the *König*. Only the *Lutzow*, which since 7.37 could only steam at reduced speed, was unable to execute this maneuver and, turning off to course SW., sought to withdraw from the overwhelming fire to which she was being subjected. The *Derfflinger* was also forced to stop for two minutes in order to clear parts of the torpedo net which had been torn away by a shell and threatened to foul the propellers. At this time the *Seydlitz* was forced to steer most of the time from the steering engine compartment, as the many hits which the ship had received had jarred out the clutch which connected the steering gear to the bridge control. The leadership of the battle cruisers thereupon devolved upon Captain Hartog on the *Derfflinger*. Since all signal halyards on this ship had been burned or shot away and the signal searchlights damaged, the captain had no means of communicating orders to the other ships of the squadron.

Meanwhile Commodore Michelsen proceeded with the *Rostock* and the boats of Flotilla III and the First Half Flotilla to gain the lee of the fifth division. As stated previously, he recalled Flotilla III from the attack, which had been ordered at 7.32 upon noticing the new maneuver of the battle fleet in turning to course west, thinking that the main body would be in greater need of these boats at some future development of the battle, since Flotillas II, VI, and IX had already fired most of their torpedoes. Further, he had the feeling that the enemy would also change their course, with the result that a destroyer attack would then simply advance into open space or else encounter only enemy light forces. On learning later of the very favorable opportunity which had offered for attack he was of the opinion that the attack had better have been carried through in spite of the recall signal. At this time he was, however, compelled to take measures to save the hard pressed *Lutzow*. At

7.50 he therefore dispatched the First Half Flotilla under Lieutenant Commander Albrecht to that vessel and these boats arrived simultaneously with the *G–37* and *V–45* of the Twelfth Half Flotilla. In the midst of a very heavy enemy fire, the flagboat of the First Half Flotilla, *G–39*, Lieutenant von Loessen, went alongside the *Lutzow* and took off Admiral Hipper and his staff in order to bring him to another of the battle cruisers. At the same time the *G–40* and *G–38*, following the *V–45* and *G–37*, laid down a smoke screen in a very effective manner which screened the *Lutzow* from the enemy ships which were firing on her. But before this screen could become effective, the *Lutzow* received four further hits, which resulted in a number of casualties to her armament. The right side of the second turret was penetrated, damaging the loading gear and the right gun, while the explosion of a powder charge put the whole turret out of action temporarily. A further shot striking between the second and third turrets broke the electric leads to turret No. 4 so that the latter was forced to use the hand-operating gear. At 8.45 the *Lutzow* fired her last shot in the battle. At the same time the enemy ships which had been firing on her lost the target and were forced to cease fire, after which the ship was lost to view.

Shortly after the turn of the fleet the Sixth Half Flotilla, Commander Theodor Riedel, which was returning from attack with the *V–48* (Lieutenant Commander Eckholdt) and the *S–54* (Lieutenant Commander Karlowa), had encountered an English destroyer between the battle lines and had engaged this boat. In this action the *V–48* had received a hit which considerably reduced her speed. The enemy destroyer was sunk immediately thereafter by a shallow torpedo shot fired by the *S–54* at 4,000 meters [possibly this destroyer was the *Shark*], whereupon several British battleships opened a very heavy fire on the *V–48*. The *G–42* (Lieutenant Commander von Arnim), which had appeared and joined the action, tried in vain to take this boat in tow or at least to save the crew. This was impossible, and in order to save herself from complete destruction this boat was forced to leave the *V–48* to her fate in order to escape the fire from the enemy battle cruisers and battleships. Steaming at full speed toward the head of his own line, the commanding officer then saw that these ships were endangered by the heavy fire, and he therefore proceeded to lay a smoke screen between the lines to protect these ships during the execution of the maneuver.

This smoke screen mixed with the screen laid down by the boats in the vicinity of the *Lutzow* and soon had the desired effect. The rear ships of the German column, which were steering west, now had a breathing spell. Admiral Scheer then, at 7.48, changed course by divisions two points to starboard in order to approach closer to the

rear of the enemy line, which was still in sight up to the time of the fleet turn. [See the formation of the German battle fleet at 6.55 in fig. 19.] At 7.55 the enemy fire on the German rear ships had noticeably weakened, and at the same time the battle cruisers again came into sight from the *Friedrich der Grosse*. The turn to the reverse course had therefore had the desired effect, and the commander in chief had again obtained the initiative.

On the English side the turn of the German fleet to the reverse course had been practically unnoticed, while in particular the two remaining ships of the Third Battle Cruiser Squadron had lost all contact with enemy battle cruisers after sheering out to port to avoid the wreck of the *Invincible*. It had been observed that one ship of the *Lutzow* class had sheered out of formation and was thought to have sunk shortly after. But, although shortly after this turn out, Captain Ellis had turned two points to starboard with the *Inflexible*, followed by the *Indomitable*, until they steered SE. at 7.45 in an attempt to renew the action, they did not sight the *Lutzow* again. On the other hand, Rear Admiral Napier, who, after the torpedo attack on the *Lutzow* at 7.35, was only about 10,000 meters to the northeastward of the German battle cruisers with the light cruisers *Yarmouth* and *Falmouth*, had noted the change of course of the German fleet to west shortly after the sinking of the *Invincible*. Apparently he did not consider this of sufficient importance to report, nor did he, as a result of the movement, attempt a torpedo attack, but seemed to be anxious only to resume his station at the head of his own column. Only in reply to a signal from Admiral Beatty at 7.40, "What is the bearing of the enemy battle cruisers?" did he reply that these had last been sighted at 7.30 turning to course west after the engagement with the Third Battle Cruiser Squadron. Meanwhile, the *Lion*, *Tiger*, *Princess Royal*, and *New Zealand* were forced to gradually diminish their fire, since the torpedoes fired by Flotilla III between 7.37 and 7.40 had caused them to sheer out of column. The last that Admiral Beatty had seen of the enemy was thus a very evident congestion at the head of the column in which the *Lutzow* had apparently turned to course SW. Even as the Germans had concluded from the course of the *Warspite* that the British had changed course to west, so Admiral Beatty came to the conclusion that the other battle cruisers had followed their flagship on this new course. He therefore changed course to SE. at 7.44, and further to SSE. at 7.48, and then still not finding the enemy in sight he made no further change to make a closer approach but at 7.50 signaled the Third Battle Cruiser Squadron to leave their advanced position near the enemy and to take position in rear of the *New Zealand* and to follow the forces

under his command. At 7.53 he reduced speed of the First and Second Battle Cruiser Squadrons to 18 knots in order not to increase the distance between his forces and the battle fleet, at the same time swinging to course south. At this moment, however, the gyro compass of the *Lion* went out of commission, causing the ship to describe a complete circle, thus delaying the advance of the whole battle cruiser squadrons to the southward by about seven minutes. [Note F, fig. 20.] At 8.01 the *Lion* was therefore again in the identical position she occupied before starting to change course to south.

As a result of the failure of the English light forces at the head of the column to fulfill their mission as a scouting force, Admiral Jellicoe was again forced to rely on his own observations for information at a critical point of the battle. During the few minutes in which most of the British battleships were firing on the enemy there had been at most three or four German ships in sight from the head and center of the column at any one time. Only the rear ships in the column had had a better view of the general situation. When the fire died out on the battle cruisers steaming about 3 miles to starboard ahead of the column it is no wonder that the battleships were unable to find any targets. Thus the *Iron Duke* had to cease fire at 7.36, the *Orion* at 7.37, and the *Marlborough* at 7.39. Only a few ships were able to fire after 7.40; these were *Neptune*, *Benbow*, *Canada*, and *Barham*, which fired until about 7.48 and 7.50, although spotting was impossible and the fire was intermittent. The observations of the enemy from the battleships were restricted by the fact that they had turned to starboard by a change of course of the division leaders and that the enemy ships had disappeared from sight. Further, the *Thunderer*, *Benbow*, and *Barham* believed they had seen a ship of the *König* class take fire and blow up at 7.50. From the above the only definite information available was that the enemy had made some sort of turn away from the British, but whether they had gone on the reverse course by a simultaneous movement, or the head of column had changed course to stand toward Helgoland was still doubtful. The only possible evolution which would have cleared up the situation for the British commander in chief and permitted him to hold the cap on the German fleet which he had so fortunately obtained would have been an immediate change of course of the battleship divisions toward the bearing of the enemy.

The fundamental policy of the commander in chief was, however, under all circumstances, and particularly in the opening phase of the engagement, to keep the center and rear ships of the battleship column outside the torpedo range of the German destroyers and battleships. He also believed, although erroneously, that all German battleships, as well as the cruisers, carried mines and that these

would be employed in any evolution where these ships turned away from the enemy. Further, he calculated strongly on the presence of submarines. Natural as would have been the decision to turn sharply toward the enemy and to follow them with the whole fleet, and much as this would have been in accordance with the best English naval traditions since the time of Nelson, such a maneuver seemed impossible to the British commander, owing to the important developments in mines, torpedoes, and submarines which, since that era, had increased the defensive armament of the weaker force. As early as October, 1914, Admiral Jellicoe had sent in a memorandum to the Admiralty, pointing out the changes in naval tactics required by the recent improvements in these new weapons. Thus, he did not believe it always possible to follow an enemy fleet in the direction chosen by the latter. "If, for instance," he continued, "the enemy battle fleet were to turn away from an advancing fleet, I should assume that the intention was to lead us over mines and submarines *and should decline to be so drawn.*" This statement of policy was thoroughly agreed to by the Admiralty, in which Lord Fisher had resumed his post as first sea lord. As a result of six months' war experience, this policy was fully confirmed, and on April 5, 1915, Admiral Jellicoe sent another supporting memorandum to the Admiralty on this subject. In general, the situation in which he now found himself did not differ materially from the hypothetical situation set forth in his communication to the Admiralty. In fact, he believed he had every reason to suspect the presence of submarines with the enemy fleet. He knew that quite a number of submarines were active in the North Sea, and, further, during the course of the action, ship after ship had reported enemy submarines. On the other hand, the clash with the German fleet had occurred so suddenly that there was some question as to whether the enemy had had sufficient opportunity to prepare such a submarine or mine trap for the British fleet.

Even if this were not the case, the other considerations still cast doubt on the advisability of following the enemy on their chosen course, while this decision was further strengthened by the fact that the British destroyer flotillas, the best protection against torpedo attack, were still attempting to reach their battle stations and were not available for a prompt counterattack. All plans for countering an evolution in which the enemy turned away under the protection of their torpedoes led to the same conclusion, "nothing but sufficient time and superior speed could bring a solution of the problem, and this meant that, if the contact of the fleets did not occur rather early in the day, it would be extremely difficult, if not impossible, to fight the battle through to a decision." The day was already drawing to a close, and thus the British commander in chief saw very slight possibility of winning a decisive victory in the action so for-

tunately begun, owing to the turning away of the enemy fleet and the decreasing visibility. One other possibility existed by which the lost battle contact could be regained: that would have been to turn the fleet immediately to course west instead of toward the previous enemy bearings in order to secure the position to the northward of the German fleet. In that case, however, the enemy would have still attained an advanced position in which the torpedoes could be used with as much effect as in the other case. The only way in which these difficulties could be overcome would have been a division of the British forces based on an independent advance of the rear and leading divisions, which might have been able to hold the rear or the head of the German column in an artillery duel. In clear weather and with a longer period of daylight remaining, something might have been accomplished along these lines. On the other hand, it was actually so late in the day and the visibility conditions were so poor that there was the possibility that the enemy would be able to meet the attack of one of the detachments of the British fleet with his full strength. This decision was therefore rejected.

Admiral Jellicoe still did not know on which course the German fleet had withdrawn, but the most probable assumption was that Admiral Scheer had laid a course for the German Bight. For the British commander in chief there was, therefore, only one decision: that was to place his forces as quickly as possible across the assumed line of retreat of the enemy, since sooner or later these forces must be sighted from that position.

At 7.44 he therefore ordered the battleship divisions to change course to SE. Shortly thereafter the *Marlborough*, leading ship of the sixth division at the rear of the column, was forced to sheer out of formation to avoid a torpedo, while at the same time a shock was felt on the *Revenge*, the next ship in line, as though a torpedo had struck without exploding. At 7.54, however, an explosion occurred on the *Marlborough* close under the forward bridge. [Note C, fig. 10.] In the forward fireroom the grate bars jarred off their supports, while water poured in from the lower bunkers through the damaged bulkheads and put five boilers out of commission. The Diesel engine and hydraulic pump compartments were also flooded and the ship listed 7° to starboard until the water could be controlled by the pumps and held at the floor plates of the firerooms, whereupon the vessel was again able to make 16 knots and resume station in the formation. At the time of this explosion the *Agincourt*, which was the rear ship of the division, reported an enemy submarine, while at 8 p. m. the *Marlborough* sighted the tracks of three further torpedoes. It was difficult to determine from which

direction these had been fired. Immediately before the explosion no torpedo track had been seen, so that the damage was believed to have been caused by a mine; but since the *Wiesbaden* was then being passed about 8,500 meters abeam, this vessel was then suspected of having fired the torpedoes, although that cruiser had already been subjected to the fire of the entire British column. Since the English destroyer *Acasta* drifted past in a helpless condition at this time, the *Wiesbaden* was at first thought to be an English cruiser by the sixth division, but finally the *Marlborough* opened fire on this brave but unfortunate German cruiser. The third and fourth salvos fired split the whole side of the ship open to the water line and both stacks went by the board. At 8.10 the *Marlborough* also fired a torpedo at the *Wiesbaden*, whereupon this cruiser drifted past, a burning wreck, until the flames reached the water line and were extinguished. But even this destructive fire had not caused the cruiser to sink. Meanwhile the *Colossus* had suddenly sighted an approaching German destroyer, which finally disappeared in the midst of a heavy fire from that ship at a distance of about 3,600 meters. Since no other German destroyer was so close to the British line at this time, it could only have been the *V–48*, Lieutenant Commander Eckholdt, of Flotilla III, which, lost from her flotilla, had decided to sacrifice herself as dearly as possible in the face of certain destruction. This destroyer probably made the hit on the *Marlborough*, if the shot did not come from the *Wiesbaden*. [While no one can ever decide to what ship can go the credit of hitting the *Marlborough*, which had immense results during the coming night, the German historian shows excellent taste in dividing the credit between these two heroic German ships.]

This sudden burst of gunfire from the sixth division had again directed the attention of Admiral Jellicoe to the rear of his column. At 7.50 he sent a signal to Vice Admiral Burney, the commander of the rear squadron, asking if any enemy capital ships were in sight. As he learned that this was not the case he believed that he had hauled out enough to the eastward in order to proceed with safety and could now place his forces on the line of the enemy retreat. At 7.55 he therefore ordered the leaders of the battleship divisions to change course four points to starboard and signaled the battle cruisers that the course of the fleet from that time on was south. At this time the *Iron Duke* passed the wreck of the *Invincible*, a terrible sight, which was only somewhat mitigated by the fact that most of the British ships thought that this was the wreck of a German battle cruiser.

At 8 p. m. the artillery duel at the rear of the line was renewed with increased intensity, as coincidentally with the change of the

British battleship divisions to course south the German fleet had begun a new surprise attack.

As Admiral Scheer withdrew from the enemy enveloping movement of his head of column by the reversal to course west at 7.35, he supposed that the enemy, hesitating to give up the tactically superior position which they had attained, would make a sharp approach to follow this movement. When, contrary to expectation, this did not occur and, instead, the enemy fire gradually died out, Admiral Scheer was inclined to attribute this to the heavy losses the enemy had sustained in the early part of the action rather than to the smoke clouds which lay between the lines. Based on the rather uncertain observations, it was believed that the enemy losses, resulting from the class of the fleets, consisted of one ship of the *Queen Elizabeth* class (*Warspite*), one battle cruiser (*Invincible*), two armored cruisers (*Black Prince* and *Defense*), and two light cruisers lost, while one armored cruiser (*Warrior*), three light cruisers, and two destroyers (*Shark* and *Acasta*) must have been severely damaged. On the other hand, the German losses were *V–48* missing, while *Wiesbaden* lay disabled between the lines and the *Lutzow*, with Admiral Hipper on board, had disappeared from view from the flagship. The other battle cruisers, as well as the *König*, appeared to have sustained severe casualties but were able to keep their station in the formation.

Scarcely had Admiral Scheer regained freedom of action, therefore, when he, far from desiring the termination of the battle but encouraged by the successful exécution of the turning evolution, decided to approach for a second attack. At 7.45 the *Moltke* reported that the enemy head of column was bearing east by south. There was still an hour before sunset and in that high latitude the long twilight would hold some time longer before darkness finally put an end to the capital-ship engagement. If he held the course taken after the turning evolution, and the enemy followed this movement, the resulting action would take on the character of a retreat, with all the disadvantages attending such a maneuver. Entirely aside from the question that in such an event the ships with reduced speed might have to be abandoned, the enemy might be able to force an action before dark and, depriving the German fleet of the initiative, be enabled to cut off the line of retreat to the German Bight. (Scheer; Germany's High Seas Fleet in the World War, p. 225; and Report to the Kaiser, p. II.) In order to counteract this there was only one means available in the opinion of the German commander in chief—"To strike another blow at the enemy by means of an energetic advance and to drive home a powerful destroyer attack. The maneuver must surprise the enemy, shatter

his plans for the remainder of the day, and, if the blow were delivered with full strength, facilitate the escape during the night. Further, there was the possibility of making a last attempt to bring assistance to the hard-pressed *Wiesbaden*, or at least to rescue the crew."

While the envelopment of the German head of column, which had occurred at 7.30, was the result of peculiarly fortunate circumstances for the English and had caught the German commander by surprise, this time the latter had determined on another attack with full strength directed against the middle of the enemy column in the full knowledge that this would expose him to the danger of the enemy "crossing the T" for the second time.

The reasons for this decision were almost the same as those which influenced Nelson at Trafalgar. The latter wrote: "I think it will surprise and confound the enemy. They don't know what I am about." The coincidence was entirely accidental. Admiral Scheer was by no means inclined to follow blindly the experience of Lord Nelson, and this would have been a false analogy under the entirely different battle requirements of modern times. The decision corresponded more to the intuition of the moment, and was so bold and keen, as well as against all rules of the game, that only success could justify the maneuver. On the English side there has been, therefore, a tendency to underrate the fundamental reasons for this decision of the German commander. (Narrative of the Battle of Jutland, No. 41. Corbett: Naval Operations, Vol. III, p. 375.) They held that Admiral Scheer had reached this decision as a result of the surprise attack of the Third Battle Cruiser Squadron, which was detached from the fleet, and that he had made a grave error in regard to the position of the British fleet as a result. They assumed that he expected to be able to pass this fleet to the northward and then from a position to the eastward to resume the engagement favored by the dark horizon under better conditions of visibility, and combined with destroyer attacks to force the enemy to the westward and safeguard his retreat toward Horn Reef. They further assumed that the appearance of the Fifth Battle Squadron to the northward had led him to believe that the British fleet had been divided and that, with such a maneuver, a part of the fleet could be cut off.

None of these assumptions were true, and, brilliant as the last-mentioned plan might have been, these critics forget that such a decision would have necessitated a much more comprehensive view of the situation by the German commander in chief for its execution than was actually the case. This criticism, based on a study of the charts after the event, must be designated as a purely theoretical construction and does not represent the true situation of the

German commander, who was forced to make decisions of the most far-reaching importance in a few minutes in the midst of the greatest uncertainty. [The above is considered excellent comment.]

As early as 7.50 Admiral Scheer had changed course of the battleship divisions two points to starboard in order to approach the enemy. At 7.55 the signal was again flying from the fleet flagship for a turn together to the right to the reverse course, i. e., ships right about, an evolution which again had to be performed with the column of ships in a curved line. At the same time the flagship ordered Commodore Michelsen to send destroyers to the *Wiesbaden*, as this maneuver now appeared possible owing to the pause in the actual fighting. By a coincidence this order was given at exactly the same time that the British fleet, 10 miles away, was changing course of the divisions to south after the first crossing of the T. At the rear of the line, the Second Light Cruiser Squadron was the only one of the British scouting forces which had been trying since 7.47 to approach the German line, in order, as Commodore Goodenough, its commander, wrote later in his battle report, "to observe the enemy's rear more clearly, their course being in doubt." [Note A, fig. 20.]

Scarcely had the German battleships executed the battle turn to the rear, in which Admiral Behncke, on the *König*, had placed his ship again at the head of the column and reduced speed in order to permit the other divisions to close up on the van and at the same time to give the battle cruisers an opportunity to resume station in advance of the line, when a number of cruisers with four stacks came into sight through the heavy smoke cloud to the northward, apparently for the purpose of making a new attack on the *Wiesbaden*, turning, at 8.05, to an easterly course. At the same time Captain Hartog turned to place his ship at the head of the battle fleet, followed by the other battle cruisers without signal, as these had scarcely noticed the evolution of the battleships. He thereupon turned toward this enemy detachment on a northerly course. At 8.05 the *Markgraf* opened fire on these enemy light cruisers followed, at 8.07, by the *Derfflinger*, *König*, and *Grosser Kurfürst*, and immediately thereafter in the gathering twilight, by the *Kaiser* and *Prinzregent*, at ranges from 9,000 to 16,500 meters. Thus the *Southampton*, which was at the head of this light cruiser squadron, was soon in the midst of an overwhelming fire. But before turning off with the other light cruisers to join the rear of the battle fleet the mission of this force had been accomplished, and before the German battle cruisers opened fire Commodore Goodenough was able to send a radio, reporting that the German battle fleet was in sight from the *Southampton*, bearing SSW. and

steering ESE. At the same time Admiral Beatty reported that he had also sighted the German battle cruisers bearing west of his position. Both of these messages seemed to Admiral Jellicoe to justify his previous movements with the fleet. At 8.05, as the German battle cruisers opened fire on the Second Light Cruiser Squadron, he held the time propitious to make a change of course of the columns of divisions from S. to SW. by S. in order to approach the enemy column on a sharp line of bearing. [Note B, fig. 20.] At this time, however, the *King George V*, which was at the head of the battle fleet, and the *Duke of Edinburgh*, which was about 3.5 miles to port of the fleet flagship, each reported sighting a submarine. Further, mistaking the purpose of Flotilla III, attempting to rescue the crew of the *Wiesbaden*, it appeared to the British that a destroyer attack was being directed at the line from the southwest.

Thereupon Admiral Jellicoe, not considering that these were only a few more of the numerous false alarms of sighting submarines which had occurred repeatedly throughout the day, ordered the divisions to resume course south at 8.09, first in order to turn toward the reported submarines and in the second place to assume a more favorable formation than a sharp line of bearing to enable the broadside batteries to counter the expected destroyer attack.

While these new evolutions were disturbing the British formation on account of the increase and decrease in speed at various places in the line, and the sixth division was still firing on the *Wiesbaden*, the rear ships of the *Colossus* division, and then gradually other ships in the line, began to sight the German battle cruisers, accompanied by destroyer flotillas, appearing through the smoke, while later the vague outlines of three or four battleships appeared faintly in the mists. Therefore, beginning with the rear ships of the column and followed gradually by all the ships of the line, the British began to open fire on the German fleet until a few minutes later even the ships on the southern flank had joined in the fire with main and secondary batteries. The German leading ships returned the fire.

At 8.04 the *Neptune* and *St. Vincent*, the third and fourth ships of the *Colossus* division, fired at a range of 9,200 meters and from four to six points on the starboard bow on the *Derfflinger* and *Moltke*, respectively, while *Revenge*, the second ship of the *Marlborough* division, also fired on the *Derfflinger*. After the second salvo of the *Revenge*, flames were seen spurting out of the after part of the German leading battle cruiser, while the third and fourth salvos of the *Neptune* were also straddles. The *Revenge* thereupon shifted her battery to the *Von der Tann*, leaving the leading ships to the other vessels in the line.

At 8.06 the *Agincourt*, rear ship of the *Marlborough* division, opened on one of the battleships, probably *König* or *Grosser Kurfurst*, which was just coming into view astern of the battle cruisers at a range of 10,000 meters, but was forced to cease fire after the fourth salvo in order to sheer out to avoid a torpedo. This may have been fired by the *V–48* or the *Wiesbaden* and was erroneously attributed to a submarine. The guns of the Fifth Battle Squadron, which had gotten into the lee of the sixth division on account of the latter sheering out to avoid torpedoes, were forced to remain silent. At 8.10, however, the *Valiant*, followed by the *Barham* and *Malaya*, were able to open fire on the German battle cruisers and battleships with their 38-cm. (15-inch) guns. At the same time the *Revenge* fired 10 salvos at the *Von der Tann*, and at 8.15 also fired a torpedo at this ship. Meanwhile the *Marlborough* had fired no less than 14 salvos in six minutes from 8.12, at a range of 9,300 meters, at a ship of the *König* class, although several gun charges were jammed as a result of the list of the ship. After the sixth salvo a considerable smoke cloud was observed near the foremast of the ship on which she was firing, while during the twelfth, thirteenth, and fourteenth salvos it was clearly observed that two shells struck under the bridge and at the water line. At the same time the *Hercules*, third ship of *Marlborough* division, fired at 8,200 meters on the second of a number of battle cruisers which were visible just ahead of the ships of the *Kaiser* class (*Seydlitz*). The *Hercules* thought that hits were made on the third and fourth salvos. From 8.13 to 8.20 the *Iron Duke* also fired on a German battleship at 14,000 meters before shifting fire to a battle cruiser. On the other hand the *Ajax*, second ship of the leading division, lay short with her salvos at 17,300 meters and was forced then to cease fire on being blanketed by the Fourth Light Cruiser Squadron. The German ships were in such a very unfavorable position as regards visibility in this phase of the battle that they could return only a weak fire to the very effective fire of the British. Only a few shell struck near the *Hercules* and *Agincourt*, while the *Colossus*, which was nearest the enemy and maintaining a heavy fire on the *Derfflinger* from 8.12 to 8.20, at ranges from 8,200 to 7,700 meters, was struck once, probably by a shell from the *Seydlitz*. After four salvos had landed just short of the British ship, a shell struck astern of the afterstack at 8.16, which destroyed the upper works and set fire to several powder charges of the secondary battery. Also, a shell in the fourth salvo, which struck short and exploded, sent splinters through the forward stack and chart house and wrecked a searchlight.

The British ships, therefore, felt themselves less endangered by the German gunnery in this, for them, very favorable phase of the battle, than by the destroyers, which, according to their observa-

tions, were massing for attack. Against these they directed the fire of their secondary batteries and later even the main batteries. What they mistook for a torpedo attack was, however, the attempt of four boats of Flotilla III to rescue the crew of the *Wiesbaden.* Scarcely had these boats broken through their own lines between the fifth and sixth divisions to carry out this order when the leading German ships opened fire on the enemy ships on the other side of the *Wiesbaden*, while the latter ship herself lay in the midst of very heavy enemy fire. Then one salvo after another which was fired at the German battleships by the enemy struck close ahead of the destroyers. Soon this enemy fire was concentrated on the advancing boats themselves. Had the attempt to rescue the *Wiesbaden's* crew been carried further, the boats would not only have hindered the fire of their own ships but would have been exposed to certain destruction without accomplishing their mission. A further advance of these valuable boats, which still had their torpedo armament intact, seemed futile, and the flotilla commander, Commander Hollmann, did not believe he could accept responsibility for such action. With a heavy heart he decided, therefore, to abandon the attempt to rescue the crew of the *Wiesbaden.* But in turning away toward their own line, the *V–73* (Lieutenant Commander Delbruck) fired one torpedo, and the *G–88* (Lieutenant Commander Scabell) three torpedoes at 6,000 meters at the second and third of a group of capital ships, which were thought to be battle cruisers; in reality, they were ships of the *Colossus* and *Marlborough* division. [Note V, fig. 20.] At 8.05 the *Colossus* had been firing with one main battery turret on a group of destroyers which appeared to be approaching at a great distance behind the *V–48.* At 8.09 the *Benbow* and *Bellerophon*, leading the fourth division, fired with main and secondary batteries, at a range of 7,300 meters, at these boats, while at 8.10 the *Neptune* also joined in this fire with a salvo from her main battery until the 10.2-cm. guns could be manned and continue the fire. At 8.11 the *Iron Duke*, leading ship, and the *Canada*, rear ship of the third division, fired, at 9,000 meters, with the secondary battery at these destroyers. All of these ships believed they had made hits and thought they observed one of the boats sink.

As previously stated, two of the boats of Flotilla III had fired torpedoes in spite of the heavy torpedo defense fire, and soon thereafter the *Neptune*, third ship of the *Colossus* division, sighted the tracks of three torpedoes of which one passed so close to the ship that it could only be avoided by a turn with hard over rudder. As the following ship, the *St. Vincent*, held her course, the *Neptune* was overlapped by the former and forced to cease fire. At the same time Admiral Sturdee's division, headed by the *Benbow*, turned

ships left two points in order to avoid torpedoes reported by the *Neptune*.

In the sudden renewal of the artillery duel at the rear of the line these ships were soon completely enveloped in smoke. Admiral Jellicoe could therefore only make out the faint outlines of the ships of this division to the northwest of his position and was unable to obtain an insight into the true situation. He was able only to ascertain the fact that the *Colossus* lay in the midst of heavy enemy fire and that enemy destroyers were attacking. He believed, however, that the rear division was sufficiently endangered to order the commander of the latter, Admiral Burney, to turn his division away from the enemy at 8.12 and to place them on course south in rear of the *Iron Duke* division, which he himself was leading. [Note D, fig. 20.] As Admiral Sturdee noted this maneuver, instead of returning to the original bearing with his division after turning ships left to avoid torpedoes, he followed the orders issued for the first squadron, and in turn placed his own forces in column in the wake of the *Iron Duke* division. Scarcely had this phase of the action begun under the most brilliant auspices for the British when the appearance of a few destroyers sufficed to influence Admiral Jellicoe to withdraw the division which stood in the most favorable tactical position for effective fire on the enemy. Even the Fifth Battle Squadron under Admiral Evan Thomas followed this movement away from the enemy, although nothing should have hindered this fast and independent force from making use of its superior position to make an even sharper approach on the enemy. The loss of the radio stations on the *Barham*, flagship of Admiral Thomas, probably influenced this maneuver. At least Admiral Jellicoe was determined, however, to bring the two southerly divisions of the Second Battle Squadron closer to the enemy. He therefore ordered its commander, Admiral Jerram, to turn ships right at 8.16 in order to place his squadron ahead of the *Iron Duke* division and on the same course. [Note E, fig. 20.] If this evolution were successful, then the British fleet would be in column on course south and in position to assume the tactical superiority by a second "crossing of the T" ahead of the German column.

But before this maneuver of the Second Squadron could be executed, this clever tactical evolution of the British commander in chief was brought to naught by a drastic counter attack of the battle cruisers and destroyers, which was ordered by Admiral Scheer.

Even at this time, the fire superiority of the British line against the German battle cruisers and *König* division, had not reached its height. At 8.14, the *Orion* and *Monarch*, leading the second division, were able to join in the fire while, at 8.17, they were followed by the *King George V* and *Centurion*, leading the column, as well as the *Benbow*, *Bellerophon*, and *Temeraire* of the fourth division.

Of these, the first two each fired from 8.14 to 8.20 on the *Derfflinger*, five to six salvos, at from 15,500 to 17,300 meters, while the *King George V*, firing at the same target at 10,000 meters, fell short with her salvos. At the same time the *Centurion*, which was following the *King George*, fired at a ship of the *Kaiser* class at 16,000 meters and observed that the latter was surrounded by destroyers and had either reduced speed or stopped. At 8.24, the *Marlborough* fired a torpedo at a ship of the *König* class. The other ships in the line were firing on the battle cruisers. As though this were not sufficient, the splashes of heavy caliber shell near the head of the German column awakened the impression that a new detachment of enemy forces was attacking from starboard. In reality, these were Admiral Beatty's battle cruisers. At 8.10, as the battle cruisers came into action, this force was about 8 miles SE. of Admiral Burney's division and 3 miles to port and ahead of Admiral Jerram's leading division and had then increased speed and hauled around on course SW. by W. In spite of this, they were 5 miles farther away from the German head of column than the *Colossus* division had been before being withdrawn. Meanwhile, the setting sun had disappeared behind the cloud banks and visibility conditions were so much improved that the *Lion* was able to distinguish enemy ships to the WNW., distant about 16,500 meters, and was able to open fire on the German battle cruisers, followed by the *Tiger* and *Princess Royal*. [Fig. 20 shows the B. C. F. much too close to the enemy.] At the same time, Admiral Beatty increased speed in order, if possible, to cut off the ships just sighted, which he held to be the advanced squadron of the enemy line.

Thus, from 8.12 p. m., the German leading ships found themselves subjected to a fire, increasing in intensity, while nothing was to be seen of the enemy but the flash of gunfire. As far as it was possible to judge, the enemy line extended from NNE., in a large arc, through east to SE., while their fire was concentrated on the German battle cruisers and the ships of the fifth division, which, apparently, made excellent targets as indicated by the position of the splashes and rapidity of fire. An attempt, on the part of the *Kronprinz*, to measure the range on the flash of enemy gunfire, was unsuccessful. The fire could be returned only very weakly and with constant interruptions even by the ships which were able to fire at all from their very unfavorable positions. Thus, the general situation at 8.14 might be characterized as the most unfavorable during the entire battle. The enemy fire from ahead raked the entire length of the German line and, under this, the fifth division began to suffer considerably, since the reduced speed, at which the battle cruisers were steaming across at the head of the line, caused a congestion at the head of column so that the sixth division was

partly forced to stop and even back. These ships, therefore, lay close together with practically no way on and offered the enemy an excellent target. The *König* had been forced to turn to course SE. in order to bring her broadside to bear on the enemy and it began to appear as though severe losses would be unavoidable in the further course of the action. Thereupon, Admiral Scheer decided to attack with the battle cruisers, without regard to the possible losses, so that, with their help, the mass attack of torpedo boats could be brought as close to the enemy line as possible while, under the protection of this maneuver, the Battle Fleet could be turned for the third time on the reverse course and thus withdrawn from the enemy envelopment for the second time.

At 8.13, the signal was hoisted on the *Friedrich der Grosse*, which has since become of historical importance, "battle cruisers turn together toward the enemy: attack with full strength." Three minutes later (8.16) the signal was made for the battleships: "Turn together to starboard to reverse course," i. e. "ships right about."

The execution of this maneuver was somewhat more difficult than the first time, as the fleet was so close to the enemy and exposed to the full effect of their combined fire. Since 8.10 the *König*, leading the battleship column, had been in the midst of extremely heavy fire, while the *Helgoland*, which was the fourth ship astern of the *Friedrich der Grosse*, had been hit, at 8.15, by a major caliber shell which gouged a hole one-half meter in diameter out of an armor plate near the bow. At the time the signal was made to change course the *König* was further endangered by the gas and smoke as a result of a direct hit behind turret No. 3. Although the *Kronprinz* and *Markgraf* were undamaged, the *Grosser Kurfurst* was hit no less than four times inside of two minutes by 38-cm. shell.

In order to expedite the evolution, Admiral Schmidt, commanding Battle Squadron I, started the turn with his flagship, *Ostfriesland*, although the prescribed method of performing this maneuver required that he start the turn only after the rear ships of the squadron had made the turn in order to reduce the danger of collision. At the same time the commander in chief instructed the commanding officer of the *Friedrich der Grosse* to turn to port in order to make room for the turn of the closely crowded fifth and sixth divisions in their turn to starboard. The units of the latter divisions were crowded in so close to each other that they were in a critical condition under the heavy enemy fire. Before the turn the *Kaiserin* was so close to the ship ahead and steaming so slowly that she was forced to sheer out to starboard. After the turn,

when she was again forced to slow down in order to increase distance from the *Ostfriesland* and make room for the *Friedrich der Grosse* which had turned to port, the *Prinzregent* approached rapidly on the starboard hand so that it was some time before the *Kaiserin* could regain position in formation astern of the fleet flagship. The *Markgraf* also turned before the *Kronprinz*, which was next astern, and for a time held off to the southward, out of formation, in order to avoid the turning point which was under concentrated fire from the enemy. Since the port engine of this ship was out of commission, the commanding officer, Captain Seiferling, deemed it necessary to get clear of the unfavorable line of bearing, *König—Kronprinz*, as soon as possible, in order to obtain sea room on the new course and be able to hold his ship in formation in spite of his reduced speed. As a result, the *Grosser Kurfürst* was forced to steam SW. parallel to the *Markgraf* until the latter was able to sheer into column behind the *Kaiserin* and *Grosser Kurfürst* between *Kronprinz* and *König*.

Thus, the ships of the fifth and sixth divisions, as well as the fleet flagship, were forced to steam practically on line of bearing, at reduced speed, in a very cramped space during an extremely dangerous period. Once again, it was due to the brilliant seamanship and training of the admirals and commanding officers that neither the turn of the fleet flagship to port was misunderstood nor collisions resulted. Fully realizing the danger of the situation, Captain Brunínghaus, commanding the *König* placed his ship 400 meters to leeward of the formation and laid a smoke screen between his fleet and the enemy line, although his own vessel was under straddling salvos. Even during the turn, the ships of the fifth division were for some time under a very effective fire that was apparently being directed on them by Admiral Beatty's squadron. A large number of shell struck so close to the *Kronprinz* that violent shocks were felt throughout the ship, although no direct hits were made. At 8.25, the *Kaiser* fired her last salvo at 16,000 meters on the starboard quarter. At the same time a full salvo struck near both sides of the ship, splinters striking the outer hull and damaging the torpedo nets and living quarters, but only one shell made a direct hit—penetrating the casemate armor and exploding in the hammock nettings. At 8.28 the commanding officer, Captain Count von Keyserlingk, ordered a smoke screen, since the enemy were still finding good targets in the German line, while they themselves remained invisible except for the flash of their guns. At 8.35 the *Markgraf* was hit by a major caliber shell which put one of the port 15 cm. casemates out of action. Aside from these casualities after the turn, the attack of the battle cruisers and torpedo flotillas was bringing a very marked relief for the fleet.

On the signal "close with the enemy" the *Derfflinger*, *Seydlitz*, *Moltke*, and *Von der Tann*, under Captain Hartog, von Egidy, von Karpf, and Zenker, proceeded at full speed toward the enemy, which were surrounding them on a wide arc and firing from all guns. The attack was carried out in compliance with the orders without regard for losses, in spite of the fact that these ships had sustained severe casualties to the greater part of their armaments and in some cases had been badly damaged. Since 8.13 the two leading ships in particular had been hit time after time. On the *Derfflinger* the entire port 15-centimeter battery had already been put out of action when a 38-centimeter shell penetrated the roof of No. 4 turret at the joint between the vertical and inclined armor plates over the right gun, turning the turret completely around to port and exploding several charges of powder in the right hoist and handling room. The gases and flame which filled the turret as a result of this explosion killed all 75 men in the crew with the exception of a single man. These gases spread through the voice tubes to the central station and forced the personnel to abandon the latter for 10 minutes after the switches had been thrown to permit the fire-control system to function. The station could be manned only after the crew had put on gas masks. Immediately thereafter the *Seydlitz* was hit aft by a major caliber shell.

The course of the battle cruisers, however, still conformed to the signal to close with the enemy, and they had attained a position 7,000 meters from the *Colossus division*—a very short range for capital ships where no armor offered protection against enemy shell—when at 8.17 the *Derfflinger* received a signal from the fleet flagship (sent at 8.14) to operate against the head of the enemy column. Thus Admiral Scheer considered the difficult mission of the battle cruisers to have been practically fulfilled. [Admiral Scheer's part in the so-called "death ride" of the battle cruisers has certainly been exaggerated. The battle cruisers, as shown by the official German charts, were already steering east directly for the enemy at 8.13, when Scheer made his signal to close with the enemy. The author now states that at 8.14 Admiral Scheer considered the difficult mission of the battle cruisers to have been practically fulfilled, i. e., in one minute. Scheer therefore directed them to operate against the head of the enemy column, which message was received by the *Derfflinger* at 8.17. But the *Derfflinger* at 8.15 had already changed course 90° to the right to parallel the British fleet. Thus the battle cruisers really paid no attention to Scheer's signals: They were already closing before he ordered them to, and they turned away before they received his second signal. Both his signal and the

conduct of the battle cruisers by Captain Hartog were splendid, but unfortunately there was no connection between them.] Captain Hartog turned his ship to course S. by E., parallel to the enemy line and was thus able to bring his broadside and torpedoes to bear on the nearest enemy ships. *Seydlitz* and *Moltke* were able to pass the turning point without being hit, and only the *Von der Tann* was struck during the turn at 8.19 by a heavy shell from the port quarter, which hit the lower part of the after conning tower, while a torpedo fired by the *Revenge* at 8.15 was avoided by change of course. [In fig. 20 S. D. I should be shown in column rather than line.] Splinters from this shell passed through the slits of the afterfire control tower, killing the third gunnery officer, Lieutenant Commander Langheld, both rangefinder operators and range transmitting crew, and severely wounding all others in that station, including the second torpedo officer, Lieutenant Plum. The greater part of the explosive force of the shell was exerted outside the armor of the main deck and spread through the gun deck and ventilating system to the starboard engine room, where parts of the fragments and wreckage lay on top of the condenser. The lights were extinguished and the starboard engine room filled with gas and smoke.

But disregarding the devastating fire of the enemy which these battle-proven German cruisers could scarcely return on account of the poor visibility conditions, they were still able to form column close to the enemy line and steaming between the latter and the rear of their own battle fleet to cover the rear battleships in their maneuver. At 8.20 they then followed the movements of their own own fleet by a simultaneous change to WSW. and then to west, in order to reach the head of their own column by the shortest route. In turning away the *Derfflinger* once more came into the midst of a heavy fire. At 8.23 a 38-cm. shell from the port quarter struck the barbette of No. 3 turret and detonated between the two guns under the turret captain's platform. In this case the shell also exploded the powder charges and killed the entire turret's crew with the exception of five men. All machinery spaces were filled with smoke and gas, when two further shells pierced the forward stack and another the after stack. Further the forward conning tower received a direct hit by a 30.5-cm. shell at the same time. Yellowish gases entered the fire-control station through the slits, but the force of the explosion and the splinters did not damage the armor so that the fire control and ship control continued to function without interruption.

While the magazines of turrets 3 and 4 were flooded, the after torpedo compartment filled with water, and the steering engine room and port engine room were filled with poisonous gases.

After this the enemy fire weakened considerably, owing to the smoke screens laid down by the German destroyer flotillas and Scouting Division II, which was to the southwest of the battle cruisers. The *Seydlitz* was hit at 8.27 by a further shell which put the right gun of the after turret out of action, while another shell damaged a 15-cm. casemate gun: but the other ships, in particular *Von der Tann* and *Moltke*, escaped without further damage. Soon after, there was a lull in the battle as the attention of the enemy was then concentrated on the mass attack of the destroyers.

As Admiral Scheer stood away from the enemy at 8.00 p. m. in order to make his approach for a second attack on the enemy line, Commodore Heinrich, second leader of destroyers, was able for the first time to reassemble his flotillas near his own battle cruisers and his flagship *Regensburg*. This vessel, with Flotillas VI and IX, had just returned from the attack on the enemy Third Battle Cruiser Squadron, while Flotilla II, returning from the attack on the *Canterbury* and enemy destroyers, was still somewhat in rear of Scouting Division II. But the Twelfth Half Flotilla had remained divided between the *Lutzow* and Flotilla II so that Flotilla VI could assemble only four boats. Flotilla IX now comprised only nine boats, after the loss of the *V–27* and *V–29* and had already fired a part of their torpedoes. Flotilla III had reassembled on the *Rostock*, the flagship of the first leader of destroyers and after the vain attempt to rescue the crew of the *Wiesbaden* was at that time to starboard and ahead of Battle Squadron III. In this Flotilla two boats *S–54* and *G–42* had not rejoined after the attack so that the flotilla now comprised only four boats.

As the intensity of the enemy gunfire increased against the leading ships and the *Regensburg* herself was under heavy fire, it appeared as though the enemy had received reinforcements in the northeast as indicated by the flashes of shells. The situation seemed to the leaders of the destroyers to be so critical for the ships at the head of the column that an attack with all flotillas appeared to be the only means of saving these ships from the destructive fire of the invisible enemy. This decision had hardly been reached when orders were received from the commander in chief for the flotillas to attack. At 8.15 Flotillas VI and IX started the attack on course ESE., followed at 8.23 by Flotilla III, which passed through the ships of the Battle Fleet. [These 3 flotillas totaled only 17 boats.] The first group was accompanied up to the *Derfflinger* by the *Regensburg*, which then turned off to bring Flotilla II to attack, while the battle cruisers turned to the southward. Soon Flotillas VI and IX had disappeared in the smoke screen, which had been laid by the destroyers near the *Lutzow*.

As these first two flotillas passed through the smoke screen they were confronted by a sight which had been granted none of the other German ships up to that time. On the arc of a large circle an iron ring of about 24 battleships were seen on course ESE. and SSE. accompanied by numerous light cruisers and destroyers. This force was enveloping the head of the German column and their guns were vomiting death and destruction. As Flotilla VI, Commander Max Schultz, approached through the straddling salvos to within 7,000 meters, a shell struck the forecastle of the *G–41* (Lieutenant Commander Boehm). Two officers and two men on the bridge were killed by the splinters. At the same time the *G–86* (Lieutenant Commander Grimm) was hit. At 8.25 a major caliber shell struck close to the bow of the boat while the splinters wounded the commanding officer and nine men, penetrated the radio room, the bridge, and the steering compartment, damaged the head of a torpedo in the forward tube and pierced the forward fuel oil tanks, causing the latter to leak. Since the flotilla might be destroyed at any minute, it was essential that the torpedoes be fired before it was too late. Thus, the flotilla commander turned away to fire immediately after the *G–86* and *G–41* had been hit. With his last remaining strength the severely wounded torpedo officer of the *G–41*, Lieutenant Wagner, personally fired two torpedoes, while at the same time the other three boats of the Eleventh Half Flotilla each fired three torpedoes under very favorable conditions for a hit on the enemy line. [Note V, fig. 21.]

All of these boats were able to return to their own line under the protection of a heavy smoke screen although the *G–86* could only steam at 25 knots and the *G–41* was forced to reduce speed even more. For a while this smoke screen from Flotilla VI covered the boats of Flotilla IX which was attacking further to the northward; but as the latter broke through the screen it appeared as though the enemy had ceased fire on the German battle cruisers and was concentrating on the flotilla. As the flotilla leader *V–28* was hit near the bow after approaching to within 7,000 meters, it was high time to turn off for the torpedo shot before the boats were put out of action. In spite of the devastating enemy fire all the boats were able to fire their torpedoes.

V–28 turned off but could fire only one torpedo as the second stuck in the tube. The *S–51* and *S–36* could each fire only one torpedo, while the *V–26*, leader of the Seventeenth Half Flotilla, fired two, but had to hold the third shot as the smoke obscured the target and the *S–52* was in line of fire. The remaining boats each fired three torpedoes, although they were in the midst of a heavy fire, at ranges from 6,000 to 7,000 meters. [Instead of the Seventeenth Half Flotilla as shown in Note W, the entire nine remaining

boats of Flotilla IX attacked. *V–28*, the flotilla leader, fired 1 torpedo, the 4 boats of Seventeenth Half Flotilla, 7 torpedoes, and the 4 boats of Eighteenth Half Flotilla 12 torpedoes, or a total of 20.]

These boats then escaped, by means of an artificial smoke screen, the pursuing enemy cruisers and destroyers which broke through the line for a counter attack. In spite of this the *S–35* (Lieutenant Commander Ihn), which was also carrying the captain and a part of the crew of the *V–29*, which had been sunk previously, was struck by a heavy shell and breaking in two, sank immediately.

On the *S–51* a hit put one boiler and the steering engine out of commission, while the flotilla leader *V–28* could make only 17 to 19 knots on account of a large hole in the bow. Commander Goehle, then turned over the command of the flotilla to Lieutenant Commander Ehrhardt, leader of the Seventeenth Half Flotilla. Later, Commander Tillessen, commander of the Eighteenth Half Flotilla took over the command and assembled the destroyer groups near the *Rostock* while the *V–28* and the *S–51* followed with reduced speed making smoke.

Since the ships which were attacked were on lines of bearing and offered excellent targets for hits the flotilla commander believed that he could certainly count on a few hits although none could be observed on account of the smoke and the splashes of the enemy shell.

When, in the meantime Flotilla III, under Commander Hollmann, advanced to attack, the battle fleet was in the midst of the turn and these boats were forced to break through the line on the opposite course between the second and third ships of the fifth division. They then passed the smoke screen which had been laid by the boats of Flotillas VI and IX which were returning from attack and standing to the northward through this smoke, they finally commenced their attack on the enemy to the eastward and southeastward after clearing this screen. [Note Z, fig. 22. In this note the destroyer sighting the British fleet was *S–54* instead of *S–32*.] To their complete surprise they sighted no enemy capital ships and turned to the southward towards a group of six ships which appeared to be enemy destroyers attacking a disabled boat, Flotilla VI or IX. Only the *S–54* (Lieutenant Commander Karlowa), which had rejoined the flotilla during the attack, and was following about 600 meters astern, passed by the turning point of the flotilla and advanced somewhat further to the eastward, was able to distinguish the outlines of the enemy capital ships. In spite of the fact that the boat steamed at full speed it could not approach the enemy column closer than 9,000 meters and therefore fired a torpedo at this range at 8.45. As the boat turned the *Wiesbaden* was again sighted some considerable distance away. At about the same time a group of British destroyers

had approached the other boats of Flotilla III and engaged the latter in a running action after turning to a southerly course at ranges of about 6,000 meters. The *G–68* fired a torpedo at one of these destroyers which was at first mistaken for a light cruiser. When light cruisers and further destroyers were sighted behind these enemy destroyers, the flotilla laid a smoke screen to protect their own battle cruisers, and turned to course SW. to rejoin their battleship column.

The torpedo attack was even more difficult for the boats of the V and VII Flotillas, as they had made the turn with the fleet and were steaming up to take position near the head of the column when the signal of the commander in chief was received for the destroyers to attack. From their position it was impossible for these flotillas to obtain a view of the situation of the battle cruisers and Battle Squadron III. Therefore, the commander of Flotilla VII, Commander von Koch, felt that an attack from his position would be useless and remained in the lee of Squadron II in order not to denude the head of column of all torpedo-boat protection. On the other hand Commander Heinecke turned with Flotilla V toward the *Rostock* immediately on receipt of the message. Both Flotillas V and VII were up to strength and had not fired any of their torpedoes. Flotilla V received orders from the *Rostock* to attack immediately on course ESE., but it was not until 8.50 that the group was able to pass through the increasingly dense clouds of smoke which lay to the eastward of the battle cruisers and the fifth division. [Note Y, fig. 22.] After passing the smoke screen nothing was sighted but a few individual light cruisers and numerous destroyers which opened fire on the flotilla at long range as these boats stood on to course south. Behind these light forces nothing could be made out on account of the enveloping smoke and a further advance without supporting light cruisers was deemed futile owing to the superior armament of the enemy destroyers and light cruisers. At 8.52 Commander Heinecke turned off and headed for his own battle fleet on course SW.

Unfortunately the strongest and fastest destroyers, Flotilla II, under Commander Schuur, were unable to join the attack. These boats, which still had all their torpedoes, had been hindered by the presence of Scouting Division II from regaining their station and had been under heavy gunfire for about three-quarters of an hour without being able to get clear. (Owing to their large turning circle they had great difficulty in following the turning movements of the leaders of the other flotillas and this had proven disadvantageous in the attack on the Third Battle Cruiser Squadron). Finally making a wide sweep the flotilla leader was able to gain sea room and was about to follow Flotilla VI through the line of battle cruisers

to attack when the smoke screen from the vicinity of the *Lutzow* drifted past and completely obscured the view. At this moment Commodore Heinrich hoisted the signal on the *Regensburg* "follow the leader." The flotilla thereupon abandoned the attack and followed the *Regensburg*. In this maneuver they became involved in further difficulties as the flagship was compelled to sheer out to avoid the battle cruisers which were making a simultaneous turn. Thanks to the superb seamanship and determination of the commanding officers, this maneuver was completed without accident. The recall of the flotilla was brought about by the fact that Commodore Heinrich had noted the lull in the enemy gunfire following the attack of Flotillas VI and IX, and judging from this that the enemy ships had turned away to avoid torpedoes, it was assumed in that case that the attack of Flotilla II would be launched into empty space as was the case of the attack of Flotilla III.

This impression of the second leader of destroyers was in accordance with the facts of the case, since the pressure on the German column which had become critical since 8.15 had been relieved. At 8.16 the *Royal Oak*, astern of the *Iron Duke*, had opened fire with her secondary battery on the approaching destroyers, followed at 8.18 by the *Agincourt*, and at 8.19 by the *Marlborough* at 10,000 meters. At 8.20 the *Temeraire*, next to last ship of the *Benbow* division, opened at 8,600 meters with the entire secondary battery. At the same time the *Vanguard*, rear ship of this division, joined in the fire with her main battery. At 8.24 the *Iron Duke*, *Benbow*, and *Canada* joined the fire on these boats at 9,000 meters. From the head of the column the *Tiger* and *New Zealand* opened with the secondary battery at 8.27 at 16,000 meters, being joined by the rear ships of the squadron, *Malaya* and *Valiant* at ranges of 7,300 meters with the entire secondary battery and two 38 cm. guns. But even this fire was insufficient to halt the torpedo attack, so that at 8.30 the *Temeraire* and *Hercules* brought their main batteries to bear on the attacking boats at 8,200 to 5,400 meters. Although a few salvos struck very close to these boats, few hits were made, owing to the numerous changes of course of the flotillas and the smoke of gunfire. It was evident that gunfire alone would not offer sufficient protection against the torpedoes of the attacking flotillas. At 8.18 the *Barham*, which was third from the rear of the column, was forced to sheer out to avoid a torpedo, while at 8.25 the *Inflexible*, in the battle cruiser fleet, sighted the track of a torpedo which passed close astern.

At 8.20 Admiral Jellicoe therefore held the moment propitious for resorting to the only method which his experience had shown was effective to counter such an attack, although in the execution of the maneuver he would have to sacrifice the effective gunfire against the enemy fleet which he had attained as a result of his superior

tactical position. This maneuver consisted of turning his ships away from the approaching torpedoes by a simultaneous movement. At this moment the *Orion* and *King George V* divisions were in line of bearing approaching ahead of the *Iron Duke*, in compliance with the previous signal, and was thus hindering the execution of the proposed maneuver. In order to gain sea room he therefore ordered Admiral Jerram at 8.21 to turn the ships of the two leading divisions four points away from the enemy. Only then was he able at 8.21 to order the other divisions to turn ships left two points. At the same time he ordered the Fourth Light Cruiser Squadron to stand to the westward at full speed to force the enemy flotillas to bear off while avoiding if possible interfering with the fire of the battle cruiser squadrons at the head of the line. At this time the second wave of the German attack was advancing on the British line. Meanwhile the hurried range-finder readings and calculations on the flagship indicated that a turn of two points would be insufficient to clear the approaching torpedoes. Therefore, at 8.25 Admiral Jellicoe was compelled to order a further turn of two points away from the enemy. [Note A, fig. 21.] While these events were transpiring, the greater part of the British destroyers had not yet reached their battle stations, and only a part of the Ninth Flotilla was available to make the counter attack with the Fourth Light Cruiser Squadron.

Since Admiral Jellicoe was still uncertain as to how far the German capital ships had turned off, he ordered the cruiser squadron at 8.32 not to approach too close to the German line. Therefore, after a short engagement with the German boats at 8,200 to 7,300 meters, this squadron turned off at 8.36 on southerly course to resume station ahead of the battle fleet. [Note B, fig. 22.] While turning six torpedoes passed close by these cruisers, headed for the fleet. Admiral Jellicoe, who was only later informed of these torpedoes, believed that the maneuver started at 8.21 had taken his ships clear of the torpedo danger zone by 8.35 [note A, fig. 22] and therefore ordered the columns of divisions to resume course S. by W. at this time. His somewhat too early turning maneuver [that is, his turns away at 7.22 and 7.25], in the execution of which he sacrificed the effective gunfire which had just reached its height, was practically useless, since the German torpedoes were just about to reach his line when he turned back to the original course. It was only due to the fact that the sea was smooth and the torpedo tracks made by the air bubbles were easily visible that the endangered ships were able to sight them in sufficient time to sheer out. At 8.33 the *Marlborough*, which had already been damaged by a torpedo hit, sighted the tracks of three torpedoes to starboard. By turning to starboard

and then hard to port the ship was able to clear one torpedo ahead and the other astern, while the third passed close by or even under the stern without exploding. At the same time the *Revenge*, second ship in the division, sheered out to avoid two torpedoes, one of which passed within a few meters of the bow and the other close astern. Further, the *Hercules* and *Agincourt* had to turn in all about six points to port to avoid two torpedoes which just cleared the bow and stern of the former ship.

The *Colossus*, leading the fifth division, was then forced to sheer out to avoid a torpedo hit while the *Royal Oak* sighted a torpedo to starboard which passed the *Iron Duke* at slow speed about 180 meters to one side, and passing through the line between the *Iron Duke* and *Thunderer*, finally sank after traveling 1,800 meters further. At 8.43 the *Marlborough* division was again endangered, whereby the *Revenge* was forced again to sheer out to port, just clearing a torpedo which passed close astern. At 8.45 a division of the British Twelfth Flotilla broke through the rear of the line and made a counterattack on the attacking enemy torpedo flotillas. (In this action a German torpedo boat of the "V" class which was near the Fifth Battle Squadron, was sunk. This boat was flying the pennant of the commander of a half flotilla. It could therefore only have been the *V–48*. [Note X, fig. 22.]

Although as a result of the so-called "percentage of hits," none of the many torpedoes fired made a hit, the tactical results of this mass attack of the German boats were very great. The twice-executed maneuver of turning away and the individual movements of the ships in sheering out from the torpedoes and erroneously reported submarines had thrown the formation of the British battle fleet into confusion at the very instant when victory seemed within their grasp. The energetic attack of the destroyers, supported by the battle cruisers, which was carried to within good torpedo range of the enemy line, and the tactical effect of this attack followed by the cleverly laid smoke screen which shrouded their further movements, showed the British that the worst might be feared if this maneuver were repeated under circumstances where the visibility conditions did not permit the torpedo tracks to be so clearly seen. The commander in chief and the commanding officers were therefore convinced that this particular experience in the battle should not be underrated. (Note Jutland Dispatches, page 98, War Diary of the *Collingwood*.) For the English a circumstance which was even worse was that after the second attack all contact with the enemy battle fleet was lost. At 8.18 the *Iron Duke* was forced to cease fire on the German battle cruisers, since the smoke screen which had been laid between the latter and the British completely obscured

the view from the British flagship. After an interval this ship was again able to make out one battle cruiser through the smoke at 8.20 but before the salvo could be fired the ship had again disappeared. Only the *Canada* and *Superb* were barely able to make out the faint outlines of the *Derfflinger* and *Seydlitz* and could fire a few salvos.

The *Monarch*, second ship of the *Orion* division, sighted the four German battle cruisers just before the turn, while the *Orion* was also about to reopen fire on a ship of the *König* class when the target was lost as the turn to port was executed. Only Admiral Beatty's forces and the ships at the rear of the line were still able to sight the German forces. Thus the *Derfflinger* and *Seydlitz* still offered a clear target to the *Collingwood*, second ship of the *Colossus* division, which was able to fire at 7,300 meters, while the *Malaya* fired on the *Derfflinger* at 9,200 meters. But even the ships in these divisions soon thereafter lost their targets as the smoke screen extended, and the *Valiant* and *St. Vincent* were then forced to hold their fire at 8.26, after the latter had been able to hold on the *Derfflinger* uninterruptedly since 7.45. Although the *Indomitable* was able to continue an interrupted fire on the *Derfflinger* from the head of column until about 8.40, practically all fire from the British line ceased after the destroyer attack. After the turn of the German fleet the sudden wave of effective gunfire of the British fleet had passed. In general this had been restricted to about six minutes.

The dying out of the British fire and the final silence created the distinct impression on the German side that the torpedo attacks of Flotillas VI and IX had caused the enemy to turn away with probable casualties resulting from torpedo hits, the extent of which were indeterminate. However, that may have been, the attack planned against the enemy center had succeeded and the fleet had been freed from a tactically inferior position. The losses sustained in the attack had not been too great a price to pay. Although the battle cruisers and leading ships of Squadron III had evidently sustained more casualties in this phase of the engagement than in the earlier part of the battle, they were still able to maintain their station in the formation and could make sufficient speed for the night cruising. Even the *Lutzow*, when sighted at 8.30 abeam of the flagship, was able to maintain a moderate speed.

During the attack of Flotilla IX, Commander Goehle had reported at 8.15 from the flotilla leader *V–28* that the enemy fleet comprised more than 20 battle ships and that the were on course SSE. This message was followed at 8.20 by a report from Admiral Boedicker, stating that the *Lutzow* was under fire from capital ships to the NE., while at 8.32 Commander Tillessen, commanding the Eighteenth Half Flotilla, reported strong enemy forces to the SE. As a result

of these messages Admiral Scheer was for the first time definitely informed that he had been engaged with the whole British fleet. It was therefore certainly to be expected that the enemy would attempt to renew the attack on the German fleet during the twilight and follow this up by destroyer attacks during the night in order to force the fleet further to the westward. Finally at dawn he would attempt to force a second battle with full strength and bring his numerical superiority to bear. If it were possible to counter the enemy envelopment and reach Horn Reef before the British fleet, the German commander would again have obtained the initiative for the next morning. In order to accomplish this the German fleet must be held in close formation and kept on the shortest route to Horn Reef, holding this course during the night in spite of all enemy attacks. At the same time every effort must be made to bring the German flotillas to attack during the night, even though they ran the danger of not being present for the expected action on the following morning. Flotillas VI and IX had not yet returned from their last attack, when Commodore Heinrich, second leader of destroyers, received instructions to employ these two flotillas as well as Flotilla II, which had remained with the *Regensburg*, for night attacks on the enemy fleet. Thereupon Admiral Scheer ordered Squadrons I and II followed by the fleet flagship to change course to SW. at 8.27 and to south at 8.45, while Squadron III and the battle cruisers closed the formation from the northeast and east [fig. 22].

In this lull in the battle the casualties which had occurred during the action could be ascertained. The following ships had no casualties among the personnel and had received practically no damage: *Kaiserin*, *Kaiser*, *Prinzregent Luitpold*, and *Kronprinz*. Even the other ships of Squadron III had suffered relatively little, although *Markgraf* was hit 5 times, *Grosser Kurfürst* 8 times, and *König* 10 times. All main battery guns were ready for action, while the secondard battery, torpedo installations and propelling machinery had suffered very little. Even the casualties among the personnel were only moderately large. On the *König* the killed totaled one doctor and 44 men, on the *Kurfürst* 2 officers and 12 men, and on the *Markgraf* 8 men. The last two ships had 6 and 7 severely wounded while the *König* had 20 men out of action on account of gas poisoning. On the other hand the damage to the ships of the fifth division, exclusive of the armament, was considerable. As a result of a major caliber hit on the *Markgraf* one compartment near the stern was flooded above the protective deck, while the propeller shaft of the port engine was apparently bent. A further shell had penetrated the casemate armor and killed the crew of one of the 15 cm. guns. Further hits had destroyed the torpedo net outriggers and rigging, damaged the instruments in the radio station while splinters had

caused a short circuit in the secondary spotting station. On the *Grosser Kurfürst* two shells striking close together on the port side forward had bent in three armor plates near the water line. A further hit on the barbette armor of Number 2 turret had penetrated the armor, while a piece broken out of the latter had gone through the torpedo bulkhead. After these hits the whole forward part of the ship except the double bottoms and torpedo compartment was filled with water up to the main deck. At the same time another shell striking the barbette armor of the forward turret caused considerable damage to the upper works forward by the resulting splinters. Further splinters from a shell striking under the casemate armor had destroyed the air ducts to the forward fireroom, while another hit had loosened the plates at the armor belt, causing the adjacent double bottoms and protective bunkers to flood.

As a result of the leaks the *Grosser Kürfurst* listed 4° to port which was finally reduced to 1° by counter flooding. After stopping the leaks 800 tons of water remained in the ship. On the *König* a major caliber shell had struck the forecastle doing considerable damage in the hull forward. A further hit moved the armored transverse bulkhead 1.5 meters aft, while the splinters penetrated the casemate armor, gun deck and main deck, putting the oil burning firerooms out of action for a time, as well as two casemate guns and exploding their ammunition. In order to minimize the danger of gases the magazine supplying these guns were flooded. Three further shells had glanced off the conning tower, the face plate of the forward turret and the forecastle, but did not detonate until after they had ricocheted, doing no particular damage. Double bottoms and protective bunkers had flooded in several parts of the ship, necessitating counter flooding to such an extent to keep the vessel on an even keel that 1,600 tons of water were in the hull. On all ships of the fifth division the mast tops nets and radio rigging as well as searchlights were full of splinter holes, but thanks to the energetic efforts of the crews the damage was repaired and the ships again in readiness for action in a very short time.

On the *Von der Tann* the loss of the two center turrets as a result of the guns failing to return to battery was particularly disastrous, but even in this case it was possible to overcome the derangement by 8.30 p. m., although any further firing would probably result in a repetition of the casualty. Shortly thereafter the after turret was again ready for action as a result of the work of the mechanics and repair gang which were able to cut away the bent plates with oxy-acetylene torches and clear away the wreckage which covered the magazine flood and drain valves, thus permitting the flooded magazines to be emptied. The turret could be operated only with hand gear after this. On the other battle cruisers this pause in the

battle was utilized to extinguish fires, drain flooded magazines and to clear away the wreckage where this hindered the service of the guns, as well as repairing the radio installations and searchlights in preparation for the night.

While the capital ships were thus engaged in repairing damage and getting the ships ready for action, Flotillas VI and IX had just returned from their attack. But it was soon evident to Commodore Heinrich, who had remained on the *Regensburg*, near the battle cruisers, that *V–28* and *G–41*, the flag boats of Flotillas VI and IX, as well as the *S–52*, had fired all of their torpedoes, while the other boats of the Eleventh, Seventeenth, and Eighteenth Half Flotillas had fired all but one torpedo apiece. As a result of hits the *V–28* and *S–51* were reduced to 17 and 21 knots, respectively, while the latter was forced to steer from aft, owing to the damage to the bridge. Therefore the group, *V–28*, *S–51*, and *S–52* joined Battle Squadron I under command of the *V–28*, while the other five boats of Flotilla IX, *V–30*, *S–34*, *S–33*, *V–26*, and *S–36* as well as *G–42* of Flotilla III, proceeded under the command of Commander Tillessen, to join the first leader of the destroyers who with the *Rostock* and Flotilla VII was steaming to the eastward of Squadron I at the head of the line. Since he did not wish to employ boats for the night attack which had less than two torpedoes, Commodore Heinrich further dispatched the Eleventh Half Flotilla to the same position. There remained available therefore only the boats which had not participated in the last attack. These included Flotilla II and three boats of the Twelfth Half Flotilla under Lieutenant Commander Lahs, the *V–96*, *S–50*, and *V–46* which had been protecting the *Lutzow*. The escort of the latter vessel was left to the *G–37* and *V–45*.

Meanwhile Flotilla III, on returning from the attack, sought to make a last attempt to reach the *Wiesbaden* but this vessel had been lost to view and this flotilla as well as Flotilla V had not yet been able to find their own main body. The only point of departure which could be used in starting the search for the British Fleet was based on the reports of the *V–28* and *V–30*, and these positions had probably been altered considerably by the subsequent movements of the enemy. As Commodore Heinrich passed the *Seydlitz* at 9.02 he was informed by that vessel that six British battle cruisers had passed to port of the *Lutzow* and were bearing SSE. at the time. This report was based on observations made by the *Lutzow* at 8.49, at which time the head of the enemy column was bearing ESE. of that ship. However, in his instructions to Flotilla II for the night attack at 9.09, the second leader of destroyers voiced the opinion that the enemy was probably to be found in the sector east to northeast. At 9.10 he changed the

assigned search sector of Flotilla II to ENE. around to ESE., while the three available boats of the Twelfth Half Flotilla were ordered to search in sector ESE. to SE. In order to give the boats a starting point free from smoke and mists he proceeded with the flotillas to a point in rear of the column to the northward. He had scarcely arrived at this point and dispatched the flotillas on their mission, when a message was received from the commander in chief, ordering all boats to attack and placing these operations under the direction of the first leader of destroyers. Commodore Heinrich, who had foreseen this order, had therefore restricted his operations to the tactically unfavorable northern sectors in order that his forces might not interfere with the search operations of the first leader of destroyers. He, therefore, reported immediately by radio to Commodore Michelsen, stating the disposition he had ordered for Flotilla II and the Twelfth Half Flotilla. [For their positions see notes X and W, fig. 23.] The latter decided against giving any further orders in order not to delay the operations of the boats during the short period of darkness, and for the time being held back the boats of Flotillas V and VII and the Eighteenth Half Flotilla which were concentrated near the *Rostock*.

Unfortunately, neither the *Regensburg* nor the *Frankfurt*, flagship of Scouting Division II, took the occasion to repeat the important report of the *Lutzow* to the commander in chief. This was sent by blinker, since neither the *Seydlitz* nor the *Lutzow* were capable of sending radio messages. Therefore the impression grew on the other ships and the fleet flagship that the last blow at the enemy center had caused the British to abandon the pursuit, and some officers were even inclined to believe that the enemy formation might even have been shattered. No one seemed able to report definitely on the position of the British battle fleet after the torpedo attack.

On the English side, the uncertainty regarding the subsequent movement of the German fleet after the last clash was no less great. Since Admiral Jellicoe had turned away to avoid the torpedoes during the last attack, an hour had passed without reports of any kind. As the last German ships which were visible from the *Iron Duke* passed out of sight in the smoke screen, the rear ships of the column were still maintaining a heavy fire. As the main battery on these ships had joined in the fire of the secondary battery against the attacking torpedo boats, the fleet flagship did not realize that this was only torpedo defense fire. Thus it appeared as though the rear divisions which were out of sight in the dark horizon were still engaged in a lively action with the German battleships and that the latter would soon reappear. Far from assuming that the German fleet had made another full turn to reverse course, the British commander was in-

clined to believe that the head of the column had changed course not more than eight points. As he turned his ships through five points to starboard at 8.35 to resume the original course of S. by W. after the torpedo attack, he believed that he would sight the enemy fleet again at any instant and be able to renew the battle.

In this expectation, he was soon to be disappointed, and was forced to conclude that the maneuver executed in turning away from the enemy, whether avoidable or not, had cost him the decision of that day. The only thing he had achieved appeared to be that now, as before, his forces were between the enemy and their line of retreat. He decided, therefore, under no circumstance to abandon this position until more could be learned regarding the location of the enemy forces. Only in this manner could he hope to find a further opportunity in the course of the evening for striking a decisive blow. After the policy of holding back, which he had displayed in the previous course of the action, it is doubtful if he was fully determined to regain contact. If this were really the case, he must have welcomed Admiral Beatty's illuminating signal sent at 8.40, showing that the battle cruisers at least had not lost all contact and that the enemy was about 10 to 11 miles NW. by W. of the *Lion*, although as a result of the errors in reckoning between the *Iron Duke* and the *Lion*, this would have placed the enemy about 2 miles on the port beam of the *Iron Duke*. It might have been assumed that since Beatty's force was not in sight from the battle fleet, it must be about 5 or 6 miles ahead of the leading ship of the column. From this the bearing of the enemy from the British battle fleet might have been easily calculated. Shortly after the receipt of this message (8.42) Admiral Jellicoe ordered the fleet to form column and from this formation to turn into line of divisions on course SW. in order to make an approach on the same course as the battle cruisers. At 8.45 the last German ship had disappeared from Admiral Beatty's view in the smoke screen laid by the destroyers. At the same time the uncertainty of the situation was further increased by an urgent message from Commodore Goodenough, commander Second Light Cruiser Squadron, at the rear of the line, according to which report a number of enemy ships of a type not distinguishable, had been detached from the fleet and were on course NW. at 8.15. What Commodore Goodenough had seen was in reality the turn of the units of the German fleet onto the reverse course, but the fact that this turn had been made was not recognized by him, nor was it to be inferred from the contradictory wording of his report. At 8.45 Admiral Beatty repeated his report on the bearing of the enemy by means of a searchlight signal relayed through the *Minotaur* to the head of the battle fleet column. Three minutes later, manifestly deceived by the turning evolution of the British fleet

at the most important moment of the battle, he sent the following message in order to give greater weight to his report, viz: "Submit that van of battleships follow battle cruisers. We can then cut off the whole of enemy's battle fleet."

Both of these signals were noticeably delayed in some manner which was never clearly explained. The message was first received on the *Iron Duke* at 8.45, and if one can accept the English account on this point, it was 9 p. m. before the message was decoded and came to the attention of the commander in chief. Meanwhile, the searchlight signal, which was reported at 8.59, sufficed to cause the latter to swing the fleet in line of divisions to course west. Scarcely had Admiral Beatty's urgent radio been reported to him when he gave instructions to Admiral Jerram, commanding the leading squadron, to follow the battle cruisers. (9.07.) In this he assumed that the latter were still in sight from the van of battle fleet, but this was not the case. On the other hand, the exact position of the battle cruisers was unknown to Admiral Jerram at the time, and he could scarcely hope to make contact with them as his ships were already steaming at 19 knots, and owing to the numerous changes of course made by the fleet, these ships were barely able to maintain their station in the formation in line with the other divisions. It was also not clear on what ground Admiral Beatty based his assumption that he could cut off the entire enemy fleet. In sending the radio with this assurance he himself had already lost contact. He was, however, trying to reestablish this as soon as possible, and had changed course to WSW. at 9 p. m. for this purpose, while at the same time he ordered the First and Third Light Cruiser Squadrons to advance as a scouting line on the same course in order to locate the enemy head of column before dark.

Under these circumstances the situation was still as full of uncertainties for the British commander in chief as before. Neither from his own ships nor from the Admiralty had he received any reasonably complete reports on the strength, disposition, position, or battle formation of the enemy forces. Neither had he been in the position to make his own observations on these points which were essential for a proper estimate of the situation on which important tactical decisions could be based. All that he had seen was a transient view of the faint outlines of a number of capital ships of the enemy forces. Whether these belonged to the van, center, or rear of the enemy formation was a question to which he received no answer from any source. Now, even these ships had disappeared, and it was still doubtful whether this disappearance was due to decreasing visibility conditions or to a large scale tactical maneuver of the enemy. (Corbett: Naval operations, Vol. III, p. 384.)

At this time, if the route chart can be considered as reliable, a German airship, the *L–14* was about 11 miles to the northward of the British fleet flagship. At all events, the *Falmouth*, flagship of the Third Light Cruiser Squadron, thought she sighted an airship over the head of the British column at 9.19 for a few minutes. The five airships which had taken off toward noon had received orders from Commander Strasser to return between 5 and 7 p. m., on account of the very uncertain weather conditions. Consequently, the *L–9* and the *L–16* had returned from their reconnaissance to the westward and landed at Hage between 7 and 8 p. m. On the other hand, the *L–21*, *L–23*, and *L–14* were about 100 miles to the westward of Bovbjerg between 7 and 7.30, or about 40 to 60 miles NW. of Hanstholm. Of these the *L–21*, Lieutenant Commander Dietrich, was scouting on the western flank of the fleet on southerly course toward the Dogger Bank, and at 9.30 had proceeded from a point about 100 miles NW. of Brokum Reef toward Helgoland, and landed at Nordholz at 2 a. m. The *L 23*, Lieutenant Commander Schubert, had also gone on course SSW. at 7.30, arriving over Vyl Lightship at 1.43 p. m., and landing at 2.30 a. m. Only the *L–14*, Lieutenant Commander Boecker, which had turned at 8.30 while on the sixth meridian about 50 miles SW. of Lindesnes, was in a good position for sighting the enemy forces. As this ship picked up a radio from Flotilla IX at 9 p. m., reporting the sighting of 20 enemy capital ships, it turned SSE. while 90 miles to the westward of Hanstholm and under conditions of poor visibility headed for the light at Lyngvig, which was made out at midnight. Although in this manner it must have passed over the entire battle field the ship neither sighted any vessels nor heard any gunfire and landed at about 5 a. m. at Nordholz. It is probable, therefore, that the position of the airship as well as the report of the *Falmouth* was in error. If it had been possible for an airship or airplane to view the battle field at about 9.10 without same being obscured by the darkness and smoke the observer would have been astounded at the situation [fig. 23]. The fleets were only 12 miles apart; the British fleet was steaming at high speed in line of divisions directly toward the German fleet, the German and British flagships in the same latitude, while the battle cruisers under Beatty, with the light forces, were about to complete another envelopment of the German head of column. Another clash of the fleets seemed imminent.

On the German side nothing betrayed the approach of the British fleet. The German forces had regained their close formation and were on course south, with the squadrons in inverse order. With this change of course the *Westfalen* had changed station with the *Hannover*, leading ship of Squadron II, so that the latter was now to

starboard and ahead of Squadrons I and III, while the *Deutschland*, the rear ship of Squadron II, was about on line with the *Westfalen*. The battle cruisers, after the numerous vicissitudes of the battle, had succeeded in rejoining the battle fleet and were now on the point of taking station again at the head of the column. At 9.10 Scouting Division IV was about 3 miles in advance of Squadron II, Scouting Division II about 4½ miles ahead of Squadron I, while the battle cruisers were nearest the enemy about 3 miles on the port beam of the *Westfalen*, and the *Lutzow* was steaming around to the rear of the line to seek protection on the western flank. Only to the northeastward was there some contact with the enemy, due to the fact that Flotilla V in returning from attack was being pursued by enemy light forces. At 9.05 the *Castor*, leader of the Eleventh Flotilla, which was steaming about 5 miles ahead of the leading battleship divisions, had sighted heavy smoke to the WNW. and had turned toward this with eight destroyers, while Commodore Le Mesurier proceeded to his support with the *Calliope*, *Comus*, and *Constance* of the Fourth Light Cruiser Squadron. [Note D, fig. 23.] At 9.15 this force was able to make out about 12 German destroyers, which, it was assumed, were about to attack the British battle cruiser squadrons to the southward on course SSW. The British light forces thereupon attacked these boats, opening fire at 9.18, and pursued them to the NW. The boats of Flotilla V stood off and finally rejoined the *Rostock*, following this vessel and the other boats in that vicinity through the intervals of Squadron III and passed to the western flank of the line. At 9.26, therefore, the pursuing British light forces were suddenly confronted by a line of battleships distant about 7,300 meters, in the center of which appeared vessels of what were taken to be the *Pommern* class, followed by ships of the *Kaiser* class on course south. The *Prinzregent*, *Kaiser*, and *Markgraf* were able to distinguish on the quarter first one and then two light cruisers with three stacks and several destroyers, and thereupon opened fire at from 5,800 to 6,400 meters. While the destroyers turned off immediately without attempting a torpedo shot under these very favorable conditions, the *Calliope* fired a torpedo at 9.30 at a range of about 5,900 meters. The *Prinzregent* fired one salvo, the *Kaiser* two salvos with main battery, while the *Markgraf* opened with her secondary battery before the enemy light forces disappeared in the mists. In this very short action the *Calliope* was hit five times, two guns being put out of action, with 10 killed and 23 men wounded.

During the progress of this action the guns of the Third Light Cruiser Squadron and the British battle cruisers opened up again farther to the southward. There Rear Admiral Napier had established a north and south scouting line about 4 miles to the west-

ward of the *Lion*, consisting of the light cruisers *Falmouth*, *Yarmouth*, *Birkenhead*, and *Gloucester*, later joined by the *Canterbury*. At 9.09 the *Falmouth* on the right flank of this line had sighted ships bearing W. by N., and had immediately reported them. Five minutes later this ship was able to make out five German light cruisers, bearing W. by N., which were about to pass the British line of scouts to the southward. The *Falmouth* turned immediately to parallel course, and at 25 knots effected a concentration with the other light cruisers in battle formation. The ships with this force sighted were the German Scouting Divisions II and IV. [Note D, fig. 23.]

On the other hand these last forces sighted four or five cruisers on the "city" class at 9.17 apparently on course southwest; and, while Read Admiral Boedicker, commanding the Scouting Division II, was reporting the sighting of these vessels, enemy battle cruisers appeared astern of this detachment. In order to open fire with his ships, and at the same time to clear the line of fire for the German battle cruisers and Squadron I, Admiral Boedicker turned to starboard, while Commodore von Reuter, in a more favorable position, turned sharply toward the enemy. The latter was soon engaged in a lively action on converging course with the enemy light forces at from 8,700 to 5,400 meters, in which the British were considerably favored by the prevailing visibility conditions.

Only the two leading ships, *Stettin* and *München*, were able to return the enemy fire with about 63 shells, while the fourth ship, *Stuttgart*, could make out only one enemy ship, which was already under fire. The *Hamburg* was forced to cease fire after one salvo, since spotting observations were impossible. Under these unfavorable battle conditions Scouting Division IV was in a critical position from the start. Evidently they offered excellent targets against the clear western horizon, and soon the *München* received two 15-cm. hits. One of these detonated in the port cutter, killing four men, and putting No. 3 searchlight out of action. The other exploded in the upper part of the third stack, cutting out a hole of 3 square meters, while the blast destroyed the lagging on the four after boilers, making it difficult to keep up steam. As the enemy, using his superior speed, hauled around ahead of Scouting Division IV, Commodore von Reuter also turned slowly to starboard, and finally turned away eight points in order to draw the enemy, who was maintaining an effective fire at 10,000 meters, toward Battle Squadron II. The enemy refused to follow this movement, and was shortly thereafter lost to view in the gathering darkness.

This action was only the prelude to a series of larger engagements.

Admiral Beatty had scarcely heard the sound of gunfire to the westward when he stood over in that direction with his battle cruisers, and at 9.18 sighted the German battle cruisers bearing NW. and ships of the *Helgoland* or *Deutschland* class dead ahead. Although the *Lion* had 3 of her heavy guns out of action, the *Princess Royal* 2, and the *Inflexible* 1 of her 8 guns, while the *Tiger* had a heavy list with more water entering the ship with every turn of the rudder; the battle effectiveness and, above all, the speed of these ships was sufficient to permit them to accept battle under the protection of the dark horizon without waiting for support from the battleship divisions. Admiral Beatty, therefore, turned to port following the Third Light Cruiser Squadron into action. At 9.20 the *Inflexible*, followed by the *Princess Royal*, *Tiger*, and *New Zealand*, opened fire at from 7,500 to 11,900 meters, in which the *Lion* and *Indomitable* joined at 9.23 and 9.26, respectively. [Note B, fig. 23.]

This sudden appearance of Admiral Beatty's forces in this far-advanced position to the southward came as a complete surprise to the German battle cruisers, since they had not been able to pick up the radio message of Scouting Division II reporting this force. [That is, because their radio stations had been destroyed.] Admiral Hipper was just on the point of stopping the battle cruisers in order to transfer his flag to the *Moltke* when suddenly the flash of gunfire was seen to the SSE. in the dark horizon and these ships were again in the midst of an overwhelming fire from an invisible enemy. Nevertheless, battle was accepted, and this force opened fire at about the same time as the British battle cruisers—at 9.20 on the *Seydlitz* and *Moltke* followed by the *Von der Tann* and *Derfflinger*—with all available guns of the main and secondary batteries. At 9.32 the *Lion* and *Princess Royal* were hit, but the targets were still very faint and observation of splashes impossible, causing the fire to be frequently interrupted. During this action the *Von der Tann* fired with four guns of the main battery and five of the secondary battery only, 8 and 15 shells, respectively. [This was very creditable work, as it will be remembered that at one time all her guns were out of action. The utility of Captain Zenker's decision to stay with his division is now seen.] Under these circumstances the enemy fire was considerably more effective, aside from their numerical superiority. While the *Lion* and *Princess Royal* evidently concentrated their fire on the *Derfflinger*, leading the column, the *New Zealand* and *Indomitable* fired on the *Seydlitz*, and soon these two German battle cruisers were suffering severely. At 9.24 the *Seydlitz* was hit amidships, while soon thereafter a heavy shell struck the only turret of the *Derfflinger*, which was still in action, and jammed the training rack for several minutes. At 9.30 a heavy shell struck No. 4 turret of the *Seydlitz*, while another struck the bridge, killing every officer and man on that station and also causing a number of casualties in the conning tower.

As well as could be observed from the British cruisers, the *Derfflinger* turned out to starboard in flames at 9.27, while the *Seydlitz*, listing heavily to port after two straddling salvos fired by the *New Zealand*, turned out of the formation. Both ships then disappeared from view, the *Seydlitz* apparently sinking. Although the last observations were incorrect, these two battle cruisers suffered very heavily from the hits received in this short action. On the other hand the *Von der Tann* and *Moltke* were uninjured. At 9.30 these last two ships turned off following Scouting Division II through the line of battleships between Squadrons I and II in order to give the latter a clear line of fire. At 9.31 the *Derfflinger* fired her last shot.

Up to this time Vice Admiral Schmidt held his course and speed with Battle Squadron I without being able to distinguish the enemy ships at which Scouting Divisions I and II ahead were firing. Therefore, when torpedo tracks were observed by the *Westfalen* and the *Rheinland*, these were at first attributed to enemy submarines, which were supposedly being attacked by the cruisers of Scouting Division II group. Soon, however, the salvos of heavy-caliber shell which passed over the battle cruisers and splashed near the leading ships—*Westfalen* and *Nassau*—covering the latter with fragments from exploding shell, showed the true situation. Since, however, the battle cruisers were in the line of fire, it could not be returned, and even when the latter were clear of the line of fire the enemy ships could not be distinguished. The battle cruisers had cut in so sharply to the westward across the head of Squadron I that the *Westfalen*, Captain Rodlich, was forced to slow down and turn out to port, followed by the *Nassau* and *Rheinland*. Only the fourth ship, *Posen*, Captain Lange, was able to pick up the turning point of the enemy forces and maintain fire on it from 9.28 to 9.35 p. m.

The final relief of the battle cruisers came from a very unexpected source—this was the attack of the six older battleships of Squadron II which had not been able to enter the actions earlier in the day. While Scouting Divisions I and II as well as Squadron I turned off and disappeared from the enemy view at about 9.30, causing the latter to cease fire for lack of targets, Squadron II, under Admiral Mauve, held its course in order to approach the enemy. In this manner the battle cruisers under Admiral Beatty were prevented from turning to follow their previous enemy and were forced to turn parallel to this new enemy force. At 9.32 the *Princess Royal* fired a torpedo at Squadron II, which, however, was ineffective, while the British battle cruisers thereupon opened fire on the German Battle Squadron II. As the enemy fire gradually drew forward of the beam, Rear Admiral Count von Dalwigk zu Lichtenfels, on the flagship *Hannover*, turned slowly to starboard to course SW. in order to bring all guns to bear. The hope of being able to dis-

tinguish the enemy better was not yet realized. The *Pommern* and the *Schleswig Holstein* were unable to return the enemy fire on account of smoke and poor visibility which prevented spotting. The *Deutschland* fired only one salvo, the *Hessen* five, the *Hannover* eight, and the *Schlesien* nine. On the other hand, this more or less invisible enemy had soon spotted on. At 9.35 the *Schleswig Holstein* was hit by a heavy shell, fired in all probability by the *Princess Royal*, which put one 17-cm. casement gun out of action. The *Pommern* sheered out of the line for a short time apparently hit, while at 9.34 a hit on the *Schlesien* damaged the secondary spotting station by splinters. As Rear Admiral Mauve saw the effectiveness of the enemy fire from his flagship at the rear of the column, he decided not to expose his ships any longer to this fire owing to the fact that the armament of these older battleships was inferior to the enemy. At 9.35 he ordered the squadron to turn to starboard eight points; to the general surprise, the enemy did not appear to follow this movement, but, judging by the location of the flash of gunfire, appeared to hold course SW. in order to haul around ahead of the German fleet. At 9.36 the *Princess Royal* was forced to cease fire, followed by the *Tiger* at 9.40, then the *New Zealand*, *Indomitable*, *Lion*, and *Inflexible*, as these ships each lost their targets in the smoke of battle and the darkened twilight. Following this each of these ships in turn was severely shaken by a heavy shock between 9.37 and 9.44, which was at first attributed to torpedoes or mines, but was later found to be due to the fact that they had passed over some wreck, probably that of the destroyer *Nomad* or *Nestor*.

The fire at the van had scarcely died out when at the rear of the column another action broke out. At 9.30 the German Flotilla II and the Twelfth Half Flotilla had commenced search operations for the night from a point in rear of the German battle fleet. Owing to the proximity of the enemy fleet the German boats operating in the sector ENE. to SE. had made contact with the enemy forces sooner than intended and before nightfall. At 9.30, the British Second Light Cruiser Squadron, forming the screen at the rear of the fleet, had sighted a German destroyer, probably *V–48*, which was still trying to rejoin the German fleet. This boat was taken under fire by the *Southampton* and *Dublin* and hit amidships, and was later destroyed by the Twelfth Flotilla. Soon thereafter further German destroyers were sighted to the NW. approaching the British line with the apparent intention of attacking the Fifth Battle Squadron. At 9.50, Flotilla II, under Commander Schuur, was forced to turn off from four British light cruisers and numerous destroyers, changing course to south and later forced off to the westward. [Note X, fig. 23.] At 9.52, the three boats of the Twelfth

Half Flotilla also came within gun range of the Second Light Cruiser Squadron and were under heavy fire for 20 minutes at ranges from 3,000 to 5,000 meters. Since it was not sufficiently dark for effective torpedo attack these boats turned off to west and northwest. In this maneuver the *S–50* was hit by a 15-cm. shell, which, while not exploding, damaged the main steam line and one boiler as well as putting the electric generators out of commission. The speed was reduced to 25 knots and this boat was forced to return to the fleet. At 10.10 Lieutenant Commander Lahs was able to join Flotilla II, and at 10.40 this force was again able to proceed on their mission to search for the enemy battle fleet.

Shortly before this clash of the German destroyers with the rear guard of the fleet, the advanced screen also sighted other German forces. The second division of the Fourth Light Cruiser Squadron, *Caroline* and *Royalist*, had not made the attack on Flotilla V with the rest of the squadron, but had remained at their station a few miles ahead of the *King George V* division. These ships had thereupon been joined by the *Castor* and the Eleventh Flotilla. At 9.45 three German battleships were sighted to the NW. which were gradually approaching the British line. At 9.55 these were reported by the *Caroline* to Admiral Jerram on the *King George V*, while at the same time the commanding officer of this cruiser, Captain Crooke, proceeded, together with the *Royalist*, to make a torpedo attack. At this point Admiral Jerram interfered and ordered the torpedo attack broken off, as he was of the opinion that the ships sighted must be part of Admiral Beatty's force which had been lost to view for some time. But Captain Crooke was sure of his observations, and, disregarding the countermanding order of his superior, proceeded to carry out the attack on his own responsibility. This was directed against the leading ships of Squadron I, which since 9.45 had been on course south. On the German side there was also considerable doubt whether the several craft sighted in the darkness at 10 to port of the *Westfalen* were friend or foe, as the position of the German Scouting Division IV was very uncertain at the time. Only after a recognition signal made by searchlight remained unanswered and two cruisers accompanied by several destroyers were made out, did the *Westfalen* and *Nassau* open fire at 10.08 at 7,400 meters. At the same time the battleships turned six points to starboard to WSW. to avoid torpedoes which might already have been fired. The *Caroline* and *Royalist* were therefore able to fire only one torpedo each at 7,300 meters. The cruisers turned away after the fifth salvo from the *Westfalen*, and following the *Comus*, which had meanwhile joined this detachment, disappeared under the protection of a heavy smoke screen.

Two torpedoes were sighted by the *Nassau*, and in spite of prompt change of course one of these passed close by the bow while the other

passed under the ship in the wake of the forward turret. The third and fourth ships, *Rheinland* and *Posen*, had been unable to see the enemy at any time. This action, in which the *Westfalen* fired seven 28-cm. shell had lasted in all 2 minutes and 24 seconds, and at 10.10 the squadron led by the *Westfalen* was again on course south. While the *Caroline*, *Royalist*, and *Comus* retired from the German line, passing through their own line of battleships, the destroyers which were following these cruisers made no attempt to fire their torpedoes in spite of their excellent position for such attack. This neglect to fire was largely influenced by the uncertainty regarding the position of Admiral Beatty's forces, on which grounds Admiral Jerram had also ordered the attack broken off. The destroyers did not deem the opportunity favorable for attack without support of the battleships of the leading division, since during daylight the enemy secondary battery could open fire at ranges too great to permit driving home the attack. [It would seem that some great opportunities were lost at this time.]

During these actions in the hours of increasing darkness a stream of messages was pouring into the fleet flagship, while from this ship some of the events could be actually seen as they transpired. In spite of this, however, some time elapsed before the general situation could be entirely cleared up. At 9.21, when gunfire was heard from the ships of the first division of the Fourth Light Cruiser Squadron 2 or 3 miles to starboard of the head of the battle fleet, it was believed that contact with the enemy had been reestablished. Therefore Admiral Jellicoe turned away two points from the enemy to course WSW. in order to bring the fleet into column parallel to the expected course of the enemy. When shortly thereafter Admiral Beatty opened fire from a position to the SW. and the light cruiser *Calliope*, about 3 to 4 miles ahead of the *Iron Duke*, appeared to be under heavy fire, Admiral Jellicoe changed course of the battleship columns back to west at 9.25 in order to make a sharper approach on the enemy. This maneuver was entirely effective, since hardly had it been executed when the faint outlines of large battleships were sighted directly ahead of the *Iron Duke* while from the forward turret no less than nine units could be plainly observed. But before the contact was definitely established, Admiral Jellicoe changed course of the columns at 9.28 to course SW. in order to bring the fleet into column. During this evolution the enemy forces were again lost to view. As a result of this excessive caution an opportunity to deliver an effective blow from the invisible background was lost again, since the German fleet was unable to observe this advance of the British battleship columns.

The cruiser *Comus* of the Fourth Light Cruiser Squadron was still firing at 9.38 and in answer to a signal inquiring on whom she

was firing, replied: "Enemy battle cruisers to the westward." On the other hand the position of the British battle cruisers at that time was doubtful. The sound of gunfire which had proceeded from the direction in which the latter were supposed to be had ceased very suddenly, and at 9.45 an urgent radio from Admiral Jerram reported that these vessels were no longer in sight. It was possible that the ships sighted by the *Iron Duke* and reported by the *Comus* might be the battle cruisers under Admiral Beatty. Not being in a position to make an estimate of the situation Admiral Jellicoe thereupon requested Admiral Beatty to report the bearing of the enemy forces from his (Beatty's) position (9.46). Scarcely had his signal been sent when a message was received from the *Falmouth*, flagship of the Third Light Cruiser Squadron, and supposedly near the battle cruisers, reporting that the enemy was bearing north of the position of the vessel and on course WSW. In this report the *Falmouth* gave a position which was very evidently 5 miles to the northward of her true position and thus placed the English battle cruisers approximately abeam of the British battle fleet. About 10 minutes later Admiral Beatty inquired of the *Minotour* regarding the position of Admiral Jerram and the leading battleship division, but that ship was unable to give a definite answer, since the British head of column had been out of sight from that vessel since about 9.10. Even Admiral Jellicoe's inquiry regarding the bearing of the enemy was delayed in receipt on the *Lion*, since the main radio antenna had been shot away, but at 9.59 Admiral Beatty had already sent a message to the commander in chief which answered the inquiry made by the latter at 9.46. This report stated: "Enemy battle cruisers and older battleships bearing N. 34′ W. from my position, distant 10 to 11 miles steering SW. My position 56° 40′ N., 5° 50′ E. Course SW. speed 17 knots."

At 10.05 this report was in the hands of the commander in chief. Thus the situation was somewhat cleared up and was further illuminated by a message which was now received from Commodore Goodenough, reporting that the Second Light Cruiser Squadron, from which gunfire was distinctly heard near the rear of the column, was in action with German destroyers which were attempting to attack the Fifth Battle Squadron. Soon thereafter, there was heard another burst of gunfire to starboard—this was the torpedo-defense fire of the German Battle Squadron I against the cruisers *Caroline* and *Royalist*.

From all of the above it was evident that the German fleet was again in the immediate vicinity of the British. The *Falmouth*, with the other light cruisers, had been in action with the German advance screen, the battle cruisers had attacked the German head of column and turned them off, and the *Caroline* and *Royalist* had made a

torpedo attack on the latter, while the *Calliope* had evidently attacked the rear of German column, the German destroyers had broken through the line in rear of the latter and had been driven off by the *Southampton* and the Second Light Cruiser Squadron. Thus, even though the British battle fleet proper had not sighted the German fleet since 8.59—the sighting of nine ships by the *Iron Duke* was only the individual report of a single turret officer—there could be little doubt on the flagship as to the actual position of the German forces. The commander in chief knew at 10 p. m. that the latter were approaching the British line and that it was only necessary for him to hold his course with the battleship columns in order to bring on another engagement. In such event he would have been able—or might have assumed that he would have been able—to force the enemy fleet still farther to the westward than had already been done in the short action of the battle cruisers in spite of the uncertainty of a twilight action, and the destroyer flotillas, the greater part of which up to now had had no opportunity for attack, could have been employed in night attacks [fig. 24]. The British commander in chief was not willing to make this decision. The sun had set about an hour before, while the battle smoke settled lower on the water, and any attempt to bring on an action at this time would have led to a night engagement. Admiral Jellicoe wished to avoid this latter contingency under all circumstances.

At 10.01, while the screens at the head and rear of the fleet, the Second and Fourth Light Cruiser Squadrons were still in action, and the *Westfalen* and *King George V*, leading the two battleship columns, were only 6 miles apart, he changed course of the British battle fleet in line of divisions to south. Only Admiral Beatty, with his battle cruisers, the First and Third Light Cruiser Squadrons, and the armored cruisers of the Second Cruiser Squadron, continued his previous course until 10.30 p. m. Of these forces the Third Light Cruiser Squadron had managed to retain contact with the enemy the longest since they had turned to course WNW., following Scouting Division IV, but these ships had been finally forced to retire before the German battle cruisers and rejoin their own battle cruiser squadrons. After this nothing further was seen of the German forces, but it might have been assumed that they were still to the northwestward of the British battle cruisers. But even the position of his own battle fleet was uncertain, and only at 9.16 did Admiral Beatty learn from a signal which had been sent from the commander in chief six minutes previously to the battle squadrons and destroyer flotillas that the battle fleet had meanwhile changed course to south. Under these circumstances

Admiral Beatty did not believe it to be either proper or desirable to approach closer to the head of the German column in the gathering darkness. These reasons were therefore:

1. On account of his distance from his own fleet.
2. On account of casualties to the armament of the battle cruisers.
3. On account of the evident concentration of the German forces.
4. On account of the fact that the latter were accompanied by numerous destroyers.

and finally because he was of the opinion that the position attained between the enemy and his base gave assurance of being able to force an engagement at dawn under very favorable circumstances. Therefore, according to his view, the decision of the commander in chief could best be carried out if he also stood on the course the fleet reported as taking. The mission of the battle cruisers in this situation was to make certain that the German fleet did not haul around to the southward from the west ahead of the British fleet and thus reach the German bight ahead of the latter. At 10.30, therefore, he changed course of the battle cruisers to south, as well as the Second Cruiser Squadron, which had been joined since 8 p. m. by the *Duke of Edinburgh* and *Chester*, and reduced speed to 17 knots, the speed of the fleet, while the First and Third Light Cruiser Squadrons were advanced a few miles to form a scouting line to the south and westward. [Fig. 25. The Second Cruiser Squadron should be shown in rear of the Battle Cruiser Fleet.] The considerations which influenced this decision were in general the same as those which caused Admiral Jellicoe to avoid a further action and to turn to the southward. This was reported by the British commander in chief somewhat as follows:

The British fleet stood between the enemy and his base. Each side possessed an ample number of destroyers, and it was very probable that in this type he had a considerable superiority, if, as might be assumed, he had dispatched all available destroyers to sea as soon as a clash between the fleets became apparent.

I therefore rejected any idea of a night engagement between the capital ships, because such an action with the presence of these large numbers of destroyers and the impossibility of being able to distinguish friend from foe might easily lead to a disaster. I was also in danger of sacrificing my superior position, if in order to approach the enemy for a further action I went on an easterly or westerly course, and decided therefore to steer south in order that I might be in the position to renew the engagement at dawn.

Further considerations along these lines led him to a clear comprehension of the inferiority of the British fleet in their equipment to repel night torpedo attacks.

It was further well known to me that neither our searchlights nor their distant controls were of the best type. The fitting of the battleships with firing directors for the secondary battery—a very important factor for night

firing—had just been started, although this work had been the subject of repeated demands. The delay was caused by the difficulties of manufacture and labor difficulties. Without this improvement, as I well knew, it was impossible to obtain our most effective fire at night. We could not, therefore, count with certainty on being able to repel torpedo attacks by gunfire. Therefore, in case that destroyers made contact with our capital ships, we would have to count on severe losses without being able to balance these by a corresponding success. Our own destroyers were not a certain means of defense by night, since, if for this purpose they were disposed in a circle around the fleet, they would have certainly been mistaken for enemy vessels and taken under fire by our own ships.

But aside from the question of torpedo attacks, the result of a night action between capital ships must be always regarded as a matter of chance to a large extent, in which the greater or inferior skill on each side would play a minor role. Such an action would necessarily be fought at very short range, in which the result would depend on the developments occuring within the first few minutes.

It is, therefore, an undesirable procedure on these grounds. The greater effectiveness of the German searchlights at the time of the battle and the greater number of torpedo tubes of their capital ships, in conjunction with the great numerical superiority in torpedo boats would, as I knew, give the Germans the possibility of obtaining considerable success in the early part of the action.

After the British commander had therefore decided to refuse a night engagement in any case, there remained only one mission for him, and that was to bring the German fleet to battle at dawn before they could reach the protection of their own coast defenses. The prospects for the resumption of such a battle depended, to some extent, upon the relative losses of the two fleets during the day engagement.

On the English side the following capital ships had been lost, viz: *Queen Mary*, *Indefatigable*, and *Invincible*. On the *Lion* and *Princess Royal* each ship had the turret out of action, but, in general, the condition of the battle cruisers was such that they were ready to resume the action at any time. In the Fifth Battle Squadron, the *Warspite*, although not destroyed, was forced to return to Rosyth. Also the *Malaya* had suffered considerably, and in particular had lost a greater part of her secondary guns crews, while the *Barham* had received a large number of major-caliber hits; but, aside from this, and in so far as their readiness for battle was concerned, such as speed and gunfire, the battle effectiveness of the Fifth Battle Squadron was about equal to what it had been before the battle. This was even more true of the battle fleet itself, in which the *Marlborough* was the only ship which had suffered any considerable damage or loss of speed. Aside from this ship, the *Collosus* was the only other ship in the battle fleet which had been hit. Of the armored cruisers, the *Defense* was sunk and the *Warrior* out of action, while the losses in the destroyer force was restricted to the *Nestor*, *Nomad*, *and Shark*

sunk, and the *Acasta*, *Onslow*, and *Defender* out of action. The extent of these losses was, however, not known to the commander in chief at that time. He was only informed that the *Invincible* and *Defense* had been sunk, that the *Warspite* and *Warrior* were returning to port, while the *Marlborough* was reduced in speed to 17 knots. On the other hand, he learned of the loss of the *Queen Mary* and *Indefatigable* only the next day, and so far as concerned the destroyers knew only of the damage to the *Acasta*, which he probably had observed himself.

On the other hand the German losses had been considerably overestimated, since the estimated resistance of the German ships was judged by British standards and further the wish was father to the thought. Although the actual losses of the Germans during the day engagement were restricted to one light cruiser (*Weisbaden*) and four destroyers (*V–27*, *V–29*, *S–35*, and *V–48*), the British counted on the certain destruction of one battleship of the *König* class, four additional destroyers and even one submarine, while the doubtful sinkings which were reported to have been observed were beyond all consideration. Although it was correct, if the British assigned a very low value to the battle effectiveness of the *Lutzow*, *Derfflinger*, and *Seydlitz*, still the ships of the *König* class had suffered considerably less than credited by the British estimates, while the other battleships had practically remained undamaged. The reports of German losses made on the evening of the battle were, however, still so incomplete that Admiral Jellicoe was forced to a large extent to rely on his own observations and assumptions on this point. This much, however, seemed to him to be a certainty: On the two occasions when there had been a battle contact of some extent between the two fleets, the German ships had been hit repeatedly and the British fire was not very effectively returned. Although the reason for this lay in the very poor visibility conditions which were detrimental to the German fire control, Admiral Jellicoe assumed from this that the British fleet was superior in the art of accurate shooting. It must be granted though that at the time the loss of the *Queen Mary* and *Indefatigable* were unknown to him. Further the reasons for the German turning evolutions were so little realized by him that he assumed the German fleet was only anxious to withdraw from the British fire as rapidly as possible. Further, he concluded from the three attacks of the German destroyers between 8.10 and 9.15, that so far as pertained to the enemy torpedo attacks and especially their ability to make hits, that these weapons had been considerably overestimated. Granted that these experiences of the day action had been restricted to the above-mentioned facts in so far as the British commander in chief was concerned and that

this had caused him to underestimate the true fighting strength of the German fleet, this very fact should have influenced him to make use of the great numerical superiority in battle units which were available to him to inaugurate another attack on the enemy. But as a matter of fact, the decision to make another attack was far from the thoughts of the British commander in chief. After the first clash of the fleets his tendency was rather to avoid further engagements while toward evening this had become a definite policy, a proof that he was still very little convinced of the British superiority in armament, gunnery, or tactics, even in the face of the results achieved earlier in the day. The day, therefore, drew to a close without the British being able to make good the severe losses sustained by striking another blow.

Chapter 13

SKAGERRAK—FOURTH PHASE—NIGHT

With the decision of the two British leaders to proceed on course south at 10.01 and 10.30, respectively, the day's action was ended. In making the definite decision to avoid further action they voluntarily gave Admiral Scheer a clear route to Horn Reef, since the latter was fully determined to hold this course at the cost of battle, or if necessary to force this passage with the full strength of his leading squadrons. While the British commanders wished to avoid a night action if possible, the German commander saw in such a battle his most favorable opportunity for the contemplated break through the enemy forces. If this were not successful, he was in danger of being cut off from his base by strong enemy forces pursuing from the northward or standing out from the enemy bases from the southward or westward. In any event he must arrive with his fleet at Horn Reef by dawn and base his decisions for further action on the results of the night action and the exigencies of the situation resulting therefrom. Therefore the constant turning off of the leading ships as a result of the attacks occurring since 9.20 appeared most unfavorable for the carrying out of this decision. He succeeded, however, by intervening with direct orders on several occasions in bringing the fleet back on the course toward Horn Reef. At 10.08 as the head of the column appeared to be turning off—a result of the attack of the *Caroline* and *Royalist*—he sent the following radio (10.10): "Main body course SSE. ¼ E.: maintain course [the German word used is 'Durchhalten!', which is a most peremptory order, much stronger than indicated in the translation]: speed 16 knots." The fact that at 10.15 the *Lutzow* was lost to view from the *König*, which was then the rear ship of the column, could not alter this decision. If the fleet reduced speed to equal that of this damaged cruiser or turned back, then it would not be possible for the former to reach Horn Reef by daylight. Since the weather was becoming somewhat misty the commander in chief hoped that the *Lutzow* might escape the notice of the enemy and thus reach port without such assistance.

Meanwhile the constant changes of course by the head of the column had greatly increased the difficulties of Flotillas V and VII, assembled near the *Rostock*, in their efforts to make contact with the enemy. After Flotilla II and the Twelfth Half Flotilla had been dispatched on their search sectors by Commodore Heinrich ENE. to

SE. from the rear of the line, Commodore Michelsen had assigned Flotilla VII the adjoining sector from SE. to S. by E. and Flotilla V the sector from S. by E. to SSW. [Fig. 35. This figure is in need of some revision. The German flotillas were supposed to start from the van of the fleet, but they actually left from a position on the port quarter of the fifth division. Scouting Division IV was ahead with Scouting Division II. Divisions 3 and 4 were still leading the battleship divisions and did not drop back to the rear until 10.15. *Seydlitz* and *Moltke* were still in the rear and did not take station on the port bow of the battleships until about 10.10.] He was led to this decision on the assumption that the enemy forces, which were to the eastward at the close of the action, would probably steam to the southward along the coast of Jutland during the night in order to renew the action with the German main body at daybreak in the vicinity of Horn Reef. In that event there was the possibility of inflicting severe damage on the enemy during the night by means of torpedo attacks in the prescribed sectors which might prove of the greatest importance to the outcome of the battle expected at daybreak. As Commodore Michelsen dispatched his flotillas at 10 p. m., the position of his flagship, the *Rostock*, and the accompanying destroyers was, as he learned later, somewhat farther to the northward than calculated and toward the westward and rear of his own fleet. In order, however, to get the fires of these coal-burning destroyers in condition for smokeless steaming preparatory to night operations, after their slacking as a result of the daylight attacks, he was forced to keep speed below 18 to 21 knots in steaming up to position at the head of the battleship column. Even at 15 knots these boats were easily visible on account of the sparks and smoke from the stacks. Further, in order to proceed to the attack in their assigned sectors these boats were forced to pass through their own battleship line once or even twice on account of the numerous changes of course made by the latter. This was a dangerous maneuver in the darkness.

A further difficulty was that owing to the uncertainty of their position they had to count on coming into the attack sector of one of the other flotillas or even advancing into the area of their own fleet, since the course of the latter converged dangerously with the assigned search bearing of Flotilla VII in particular. Therefore when contact was made there would be great uncertainty whether the vessels sighted were friend or foe. The division of the flotillas into individual groups operating singly, as originally planned, had to be abandoned for this reason by Commander von Koch, commanding Flotilla VII, and since a higher speed would have been detrimental, he proceeded at 17 knots on course SE. in close formation. In Flotilla V, under Commander Heinecke, steaming on course S. ½ W., the order to proceed in individual groups was delayed on ac-

count of the change to the opposite flank, which was twice executed, and the interfering smoke, so that this flotilla did not deploy until after midnight. Unfortunately, it had been impossible for either the destroyers or light cruisers to establish the very essential contact with enemy main body before dark. Further, there was the danger that the flotillas, acting singly, might be annihilated by some of the numerous enemy light forces or possibly forced so far out of their sectors that they could not regain stations near their own main body in time for the expected renewal of the action at daylight. Although Admiral Scheer in ordering the night attack of the flotillas had assumed this risk, Commodore Michelsen still thought it of greater importance to have these boats again under his immediate orders at daylight. He therefore sent radio instructions at 11.30 p. m. for all boats to rendezvous by Horn Reef at 3 a. m. and prepare to rejoin the fleet in that vicinity. Only in case they were forced off their course were they permitted to take the return route through the Skagerrak, as Commondore Heinrich had already ordered for Flotilla II.

After dispatching Flotillas V and VII to attack, Commodore Michelsen still retained five boats of Flotilla IX and one boat of Flotilla III which he held for the time being in reserve. While he rejoining Scouting Division II with the *Rostock*, Commodore Heinrich, with six boats of Flotilla III which had meanwhile returned, followed with his flagship *Regensburg* in the wake of the *Derfflinger* and later the *Von der Tann* at the rear of the line. There he was joined at 11.27 by the *S–50*, of the Twelfth Half Flotilla. Although Commander Hollmann, commanding Flotilla III, requested that his boats be dispatched to the attack, Commodore Heinrich deemed it advisable to keep this flotilla in reserve to meet any unforeseen contingencies.

When Flotillas V and VII were dispatched on their mission, Battle Squadron II was leading the German fleet. Admiral Scheer thereupon decided against leaving this squadron in that position in the formation on account of their insufficient protection against torpedo attack. At 10.10 he had therefore ordered that it take position at the rear of the line. Although there was the danger that the enemy might regain contact from the northward at daybreak and bring pressure to bear on the rear, there would then still be sufficient time to assign this squadron another position in the formation. At 10.20 the *Westfalen*, leading Squadrons I and III, changed course to SW. by S., in order to pass astern of Squadron II, so that the fleet, contrary to the wishes of Admiral Scheer, was again delayed in its advance toward Horn Reef. Since Vice Admiral Schmidt, commanding Squadron I, did not appreciate the reason for this new turn to port [it seems as if this should be "starboard,"

as it apparently refers to the *Westfalen's* change to SW. by S. at 10.20. The German text is obscure here and does not correspond to the German charts, which show the *Westfalen* changing course to the left at 10.20 rather than to the right], he was about to order the *Westfalen* to steer SSE., when Admiral Scheer again signaled the course of the fleet as SSE. ¼ E., and at 10.29 sent the following signal regarding the fleet formation, viz:

"Squadron II in rear of Squadron III, battle cruisers at the rear of the columns, Scouting Division II ahead, Scouting Division IV to starboard." [It will be noted that fig. 25 was based on this signal.]

At the time Scouting Division II was to port and abeam of Squadrons I and III in the process of steaming up to position, while Scouting Division IV had been forced out to the starboard side of Battle Squadron II during the turn of the latter. Scouting Division IV thereupon dropped back to the rear of this squadron in order to take station as ordered on the starboard flank of Squadrons I and III. But Battle Squadron II had still apparently not received the order to take station at the rear of the column when at 10.30 the *Hannover*, leading ship of the division, sighted dead ahead the very faint and barely discernible smoke of four large ships and for a few moments a bright truck light. This was immediately reported by radio. What they had sighted were the armored cruisers of the British Second Cruiser Squadron which at the time was crossing a few miles ahead of the German Battle Squadron II in order to join forces with Admiral Beatty's battle cruisers. (In the list of messages appended to the Jutland dispatches, the following is quoted on p. 472: At 10.17 a signal from the *Duke of Edinburgh* to the *Shannon:* "Your truck light is burning.")

Rear Admiral Count von Dalwigk zu Lichtenfels thereupon sent a blinker message to Scouting Division IV to resume station ahead. At the same time Commodore Michelsen, who was steaming up with the *Rostock* and the Eighteenth Half Flotilla, which had been assigned the scouting sector SSW.–SW., ordered the latter to attack the enemy ships just reported, although the great distance and probable higher speed of the enemy as well as the impossibility of obtaining an insight into the situation ahead made the success of this attempt problematical from the start.

Rear Admiral Mauve, commanding Squadron II, had just at that time received the radio message directing him to take station at the rear of the column, but delayed the execution of the maneuver until the situation at the head of the column was further cleared up. At 10.50, receiving no further reports of the enemy ships which had been sighted, he turned his ships to the reverse course and at 11.10

made a further turn to bring his squadron in column astern of the *König*, which was in rear of Squadron III. [Taking station as shown in fig. 26, third and fourth divisions.] This belated evolution to put the fleet in night cruising formation might have led to a dangerous situation in the increasing darkness and the proximity of the enemy forces, particularly since the battle cruisers were still out of the column and cruising on the port beam of Squadron I. Not until 10.05 had it been possible for Admiral Hipper, who was with his staff on board the *G–39*, to transfer to the *Moltke*. Apparently he had not received the order to take station with his battle cruisers at the rear, for no sooner had he hoisted his flag on the *Moltke* when he made signal for 20 knots in order to reach the head of the column. But only the *Moltke* and *Seydlitz* carried out this order, since the *Derfflinger* was too severely damaged and the fires of the *Von der Tann* were too much in need of cleaning to permit a speed greater than 18 knots. Thus the distance between the first two battle cruisers and the latter increased rapidly. Thereupon the *Derfflinger* and *Von der Tann*, which were then abeam of the fleet flagship, again received orders to join the rear of the line, and in compliance with these orders took station astern of Battle Squadron II. Thanks to the expert seamanship of the squadron and flotilla commanders, as well as the commanding officers, the night cruising formation was assumed shortly after 11 p. m. Twenty-four ships, darkened and ready to open fire at any instant, were now in battle column at 16 knots on course SSE. ¼ E.

While the German night-cruising formation was based on the principle of attack, the British was determined primarily by the decision to avoid a night action under all circumstances. Seven minutes after Admiral Scheer had given orders for the disposition of his forces for the night (10.17) Admiral Jellicoe sent the following radio for the night-cruising formation of the British fleet: "Take station in accordance with organization No. 2; form squadron columns disposed abeam to port, 1 mile apart." As a result of this order, the fleet, which had maneuvered during the day in columns of six divisions, was regrouped in three squadron columns for the night cruising, to which the Fifth Battle Squadron added a fourth column on the eastern flank. [Fig. 26.] By reducing the six columns to three (or seven columns to four, if the Fifth Battle Squadron is counted in), with greatly reduced interval between columns, he hoped to increase the difficulty of the German flotillas in finding the fleet, avoid mistaking units of his own fleet for enemy ships, and to maintain closer coordination of his forces during the night. He thereby took the risk that the slightest counteroffensive on the part of the enemy would involve his forces in an extremely difficult situa-

tion. If one of the flank divisions were to be engaged in action or forced to turn toward the other columns to avoid a torpedo attack, the whole fleet would be thrown into the worst possible confusion. There was therefore every reason to avoid an action at all costs while in this formation. But instead of employing his destroyer flotillas for offensive operations during the night, the British commander in chief ordered them to take station as a screen in rear of the fleet at 10.27, at a distance of 5 miles astern of the battleships. He further feared that, owing to the known proximity of the German fleet, his own force might be mistaken for enemy ships and fall a victim to the attacks of his own destroyer flotillas. [The British formation ordered is shown in fig. 26, but probably was not actually assumed until about 10 p. m. G. M. T.]

Having decided to assume no risks during the night, the British commander in chief took particular care to neglect no opportunity for bringing the German fleet to battle at daybreak. The possibility that the latter might take the line of retreat around Denmark through the Cattegat could, in his opinion, be excluded. Admiral Scheer was 344 miles distant from the Little Belt when the daylight engagement was broken off, and if this route were chosen the Germans would then give the British an entire day for the pursuit and renewal of the engagement. The greatest fear of the British fleet commander was therefore that during the night Admiral Scheer would attempt to break through to the eastward either ahead or behind the British battle fleet. There were three possible courses on which the enemy might reach the protection of his own bases. The first lay past Horn Reef over the Amrum Bank, the second between the British and German mine fields to the westward of Helgoland, while the third lay along the coast of Friesland from the Ems to the Jade. All three routes were known to the Admiralty and the British commander in chief. Of the three routes, the course past the Ems along the coast was the least probable for the German fleet, since this was considerably longer than either of the others. The course past Helgoland would have given the German fleet a distance of 175 miles to steam from their 10 p. m. position, while to Horn Reef the distance was only 142 miles. Although every probability pointed to the enemy taking this last route, Admiral Jellicoe, for some extraordinary reason chose to steer a course with his fleet which would put him in position to cut off the German retreat in case the latter took the route to the Ems or Helgoland. In order, however, not to leave the blocking of the route past Horn Reef to the three submarines alone which had taken station near Vyl Lightship and were hardly capable of fulfilling this mission, he ordered the mine layer *Abdiel* at 10.32 to proceed at full speed in advance and, in accordance with orders previously issued, to strengthen during the

night the mine fields which had already been laid to the southward of the station occupied by the British submarines. The commander in chief placed his greatest hope of preventing the Germans from taking the route past Horn Reef on the screen of destroyer flotillas in rear of the fleet. He was of the opinion that in the event of the Germans attempting to pass the rear of the battle fleet a mass attack of these boats would certainly force the enemy off to the westward.

As a result of the disposition of the two forces for the night there arose the following peculiar situation: The German fleet was cruising to the southward close behind the British, whereby the *Westfalen*, leading the column, was, at 11.30, only 6 miles on the port quarter of the British battle cruisers and the same distance directly abeam of the western column of the closely crowded enemy battle fleet. Both fleets were on slightly converging courses, and it would not be long before these courses crossed. [Fig. 26 shows the positions of the two fleets very accurately, except that Beatty was several miles nearer the High Seas Fleet.]

As a result of the numerous changes of course made by the battle fleet in taking position for the night-cruising formation, the *Moltke* and *Seydlitz*, of Scouting Division I, and the *Frankfurt* and *Pillau*, of Scouting Division II, were unable to attain their position as intended at the head of the column and were still on the left flank of the battleships, trying to take position ahead of the line. Even Scouting Division IV was at the time on the port side of the battleship column, although the commander of this division, Commodore von Reuter, assumed that he was to the southwestward of his own main body, in the position he had been ordered to take as screen on the right flank. As a result of condenser trouble the *Elbing* had not been able to follow Scouting Division II and had joined forces with Scouting Division IV, together with the *Rostock*, flagship of the first leader of destroyers. (In Scouting Division IV the following vessels therefore followed the *Stettin*, viz: *München*, *Frauenlob*, *Stuttgart*, *Hamburg*, *Elbing*, and *Rostock*. Meanwhile Scouting Division II was comprised only of the *Frankfurt* and *Pillau*.) Still further to the eastward and astern was Flotilla VII. (Leader: *S–24*. Thirteenth Half Flotilla: *S–15*, *S–17*, *S–20*, *S–16*, and *S–18*; Fourteenth Half Flotilla: *S–19*, *S–23*, *V–189*, *G–172*. *V–186* had returned to Helgoland during the forenoon on account of condenser trouble.) At 10.30 this flotilla had passed astern of Battle Squadron III in order to stand out on its course to attack the enemy, had been mistaken by a ship of Battle Squadron III for enemy destroyers, and fired on at 1,800 meters. One salvo struck within 50 meters of the *S–23*, and the flotilla commander had thereupon changed course to SE. in order to increase the distance from his own battle fleet.

At this time, however, British destroyers approached the German cruisers and destroyers, which were still on the right flank of the battleships.

These British destroyers had received orders at 10.27 to take station 5 miles astern of the battleships and were disposed as follows: On the western flank the Eleventh and Fourth Flotillas, while farther to the eastward were the Eighth, Ninth, Tenth, and Twelfth Flotillas. These boats had just steamed to the northward between their own battleship columns and were about to turn to the southward to take their assigned stations in the formation when the German Flotilla VII approached from the NW. At 10.50, therefore, the *S–24*, flotilla leader of the latter group, sighted a column of destroyers dead ahead, which were the boats of the British First Half Flotilla of the Fourth Flotilla, led by the flotilla leader *Tipperary*, and soon thereafter six other destroyers were sighted to port. (The First Half Flotilla, led by the *Tipperary*, consisted of the *Spitfire*, *Sparrowhawk*, *Garland*, and *Contest;* the second, led by the *Broke*, comprised the *Achates*, *Ambuscade*, *Ardent*, *Fortune*, *Porpoise*, and *Unity*.)

While still at a distance of 400 to 500 meters these boats were mistaken for destroyers of the German Flotilla II. When the recognition signal made by the German flotilla leader remained unanswered, the *S–24*, *S–16*, *S–18*, and *S–15* fired one torpedo each at 10.58. But whether they were warned by the flash of the torpedoes leaving the tubes or by the splash of the torpedoes in the water, the enemy at all events turned away on the first shot, so that the other boats could not fire, and none of the torpedoes made hits. [The positions of the Fourth Flotilla are shown in figs. 25 and 26, but their action with Flotilla VII is not indicated.] Thereupon the flotilla commander, on the correct assumption that he had made contact with the enemy protective screen in rear of the battle fleet, turned to the southward in order to pass clear of the western flank of this screen without being betrayed by searchlights or gunfire. In the British flotilla, fire was opened only by the destroyer *Garland*, which boat also reported the enemy flotilla by radio at 11.02. Shortly thereafter a few torpedoes passed by the *Garland* and the enemy disappeared from sight. The fact that the British destroyers did not follow the Germans could only be explained on the German side by the assumption that the British were prompted by the same desire as the Germans, i. e., to approach the enemy battle fleet for attack without being sighted. In reality, the British Fourth Flotilla had just turned to the southward and was on the same course as the German flotilla.

At the same time the two cruisers of the German Scouting Division II, somewhat farther to the south and westward, clashed with the British Eleventh Flotilla, which was being led personally by Commodore Hawksley, on the light cruiser *Castor*. (The Eleventh Flotilla consisted of the light cruiser *Castor*, and the destroyers *Ossory*, *Mystic*, *Morning Star*, *Magic*, *Mounsey*, *Mandate*, *Minion*, *Martial*, *Milbrook*, *Moon*, *Marne*, *Manners*, *Michael*, and *Mons*.) The leaders of the latter were still on course north when they were sighted by the *Frankfurt*, and were mistaken for five cruisers and reported as such by radio. These could not have been boats of the German Flotilla II, as the latter were farther to the northward. Thereupon the *Frankfurt* and *Pillau* each fired a torpedo at 1,000 meters, and, without firing or displaying any lights, turned off to the westward in order not to draw the enemy destroyers now sighted behind the light cruiser toward their own battle fleet. The British flotilla thereupon turned off to course south. At this time Scouting Division IV steamed up astern of Scouting Division II, and the *Castor* sighted at 11.05 three or more cruisers on her starboard hand, of which the leading ship of the group appeared to be an armored cruiser. The latter made the British recognition signal, which increased the doubt as to whether these ships were friend or enemy, and immediately thereafter flashed their searchlights and opened on the *Castor* with rapid fire at 1,000 meters. [In note A, fig. 26, the forces engaged on the German side were Scouting Division IV instead of Scouting Division II.] This fire was returned by the latter at 11.15. The ships which opened fire were the *Hamburg* and *Elbing*, at the rear of Scouting Division IV. On the *Hamburg* the radio antenna was torn away, the after stack, engine-room deck light, and port longitudinal bunker pierced, three firemen and the crew of No. 3 gun severely wounded. On the British cruiser *Castor* a shell set one of the boats afire, thus lighting up the ship and six more hits were sustained. All signal apparatus was put out of commission, 12 men killed and 23 wounded, the side armor protecting the vessel from more severe casualties. In turning away, the *Castor*, *Magic* and *Marne* each fired a torpedo, one of which passed under the *Elbing* without exploding in spite of all efforts on the part of the latter ship to turn clear. The other destroyers, blinded by the gunfire of the *Castor* and still under the erroneous impression that they were under fire from their own ships, did not fire. Searchlights were extinguished, and the leader of the Eleventh Flotilla decided against making a second attack as he did not wish to lose contact with his own battle fleet, which was steaming ahead. Apparently he deemed it more important to be with his fleet at the time of the expected action at daybreak than to attempt to obtain results during the night.

During the progress of this action the battle cruisers *Moltke* and *Seydlitz* approached Scouting Division IV from the other side, and about 1,000 meters on the port beam of the head of Battle Squadron I, passed sharply across the bow of the *Stettin* (11.35). In order to avoid collision the latter was forced to slow down, while the *München*, *Frauenlob*, and *Stuttgart* sheered out to port. At this time four enemy cruisers of the "city" class were sighted on the port quarter distant 3,000 meters on a slightly converging course. (These were the ships of the British Second Light Cruiser Squadron.) [Notes B and Z, fig. 26.] These ships were about to take station astern of the battleships and had observed the engagement of the *Caster*, when they were challenged by the German ships to display the recognition signal. In reply to this the *Dublin*, second ship in line, opened fire at 700 meters. At the same time about a dozen searchlights flashed from the German ships and the *Southampton* and *Dublin* were overwhelmed by a hail of fire. On the other hand, the *Nottingham* and *Birmingham* did not light their searchlights, and not being under fire were able to return the enemy fire with greater effect. The engagement which now set in was at such short range that no salvo could miss, and grew to terrific intensity. The *Stettin* and *München* and the *Frauenlob* and *Stuttgart* concentrated their fire on the two leading ships, and although they were inferior in fighting effectiveness, fires soon broke out on the *Southampton* and *Dublin*. On the British flagship the searchlights were extinguished and the guns ceased to fire. The *Stettin*, Commander Rebensburg, was about to turn off to fire a torpedo when that ship as well as the *München*, Commander Bocker, received two hits. On the *Stettin* one searchlight and the battle-order transmitter were put out of action, while another shell burst a steam line, causing the view to be completely obscured. Commodore von Reuter then turned away to draw the enemy toward his own battle cruisers. The other ships were too closely crowded together on line of bearing to be able to fire torpedoes, with the exception of the *München*, which ship, turning towards the enemy with the *Frauenlob*, was able to fire one torpedo. On the *Hamburg*, Commander von Gaudecker, 10 men were killed, while the commanding officer, navigator, and some men on the bridge and at the forward gun were wounded. The *Elbing*, Commander Madlung, received one hit which wrecked the radio station, killing 4 men and wounding 14. At this moment the sound of an explosion drowned out the noise of gunfire and the shriek of the shell. Shortly after sighting the German ships the *Southampton* had fired a torpedo while her upper deck and bridge were in a hail of shell from the enemy. This torpedo found its target, and hit the *Frauenlob*, Commander Hoffmann, in the port auxiliary machinery space. The electric lights went out, the ammu-

nition hoists failed, and the ship listed far over to port, causing the shell in the magazines to shift while enemy shellfire set the after part of the ship afire. But nothing shook the heroic determination of the crew. Standing in water up to their waists the crew of No. 4 gun, under Boatswain Schmidt, continued to fire until the flames and water made an end to the struggle. The cruiser capsized and giving three "hurras" for the Kaiser and the Empire, the commanding officer, 11 officers, and 308 men sacrificed their lives to their country. [An inspiring episode.]

The *Stuttgart*, Commander Hagedorn, was barely able to avoid the sinking *Frauenlob*, by sheering out to starboard. In doing so she lost contact with Scouting Division IV, and sighting later one division of the Battle Squadron I to starboard, joined forces with this group. The *Hamburg* was also forced out of formation by the fact that the battle cruiser *Moltke* crossed sharply across her bow, while in the midst of the action. Only the *Elbing* and *Rostock*, passing ahead of the *Hamburg*, were able to rejoin the *Stettin* and *München*. In the confusion caused by this crossing of courses the *Seydlitz* lost the truck light of the *Moltke* and, not being able to maintain the speed of 22 knots, took station ahead of the fleet and, at a distance of 10 miles to the eastward of the latter, proceeded independently toward Horn Reef.

Meanwhile the British Second Light Cruiser Squadron had disappeared from view of the German ships. Fired on with ninety-two 10.5 shell from the *München* alone, these ships had suffered severely. On the *Southampton* the German shell had annihilated the crews of the searchlights and guns, killing 35 and wounding 41 men. The ammunition was constantly exploding, and for awhile it appeared as though the whole ship would blow up. On the *Dublin* fires raged between decks. A continuation of the action was out of the question. Before the *Frauenlob* went down these ships turned away to the eastward and continued on this course until they joined up with the Fifth Battle Squadron. After extinguishing the fires on the *Southampton* and *Dublin*, this force turned to course south, in rear of the battleships. In this maneuver the *Dublin* lost contact. On that ship the navigator had been killed and all charts destroyed, and it was not until the following morning that this ship was able to rejoin the Second Light Cruiser Squadron. As for the commander of this squadron, Commodore Goodenough, who had distinguished himself by such excellent scouting service up to that time, it was impossible for him to make a report of this action, as the severely damaged flagship was unable to send a radio message.

During these engagements the *Moltke* and *Seydlitz*, which were steaming up between Scouting Division IV and the German battle fleet, had become separated and steamed thereafter to port and star-

board, respectively, ahead of the fleet, on course south. Scouting Division IV was still firing at 11.30 when the *Moltke*, *in* attempting to rejoin the fleet, sighted four large enemy ships to port which appeared between this battle cruiser and her own main body and were apparently maintaining contact with the latter. Without suspecting that these were the rear ships of the British Second Battle Squadron on the right flank of the British fleet, the *Moltke* turned away and was forced to abandon any further attempts to rejoin her own battle fleet after repeatedly making contact with this same enemy force at 11.55 and 12.20 a. m. Unfortunately this occurred so suddenly each time that the torpedo tubes could not be brought to bear without remaining too long in the zone of fire of this superior enemy force. This ship thereupon turned to course south in order to avoid further dangerous contacts, and was able at 1.30 a. m. to rejoin the German battle fleet. The *Seydlitz* also sighted three enemy ships at 12.45 to port distant 1,500 meters on course south. This ship, being very much reduced in fighting efficiency, turned off to the northward after making the English recognition signal, but was again forced to turn off to the eastward to avoid three destroyers which were at first thought to be boats of the German Flotilla II. At 1.12 a. m. the *Seydlitz* was finally able to resume course toward Horn Reef at 21 knots, and was able to observe from a great distance to starboard a number of actions in which the German leading battleships appeared to be involved. At 1.08 this ship reported the sighting of enemy vessels by radio and designated them as battle cruisers, but it was later determined that they must have been three ships of the *Malaya* class. The *Moltke* was unable to report contact with the enemy ships until 3.27 a. m., as her radio had been disabled during the daylight engagement, the message then being sent through the destroyer *G–39* to the commander in chief. Unfortunately neither of these message reached the destroyer flotillas which had been dispatched to attack enemy forces. [It is remarkable that two battle cruisers sighted the British battleships, while the destroyers failed.]

Up to midnight the German commander in chief had received reports of contact with light forces only. None of the flotillas which had been sent to attack had encountered other than light cruisers and enemy destroyers, and the position of the enemy battle fleet was still as doubtful as before. Admiral Schèer could by no means assume that the actions reported were with the rear guard of the enemy battle fleet; on the contrary, everything pointed to the conclusion that the British commander in chief had detached his destroyer flotillas from the main body and that these, supported by light cruisers, had been ordered to attack the German fleet. Admiral Scheer saw no necessity for turning away from these destroyer attacks, owing to the well-known excellent training of the fleet in

torpedo defense tactics, particularly since his principal mission was to arrive at Horn Reef at daybreak. He therefore continued on his course regardless of the sporadic actions which broke out on the left flank, determined to defy any counteroffensive, no matter how strong the opposing force. Thus, the head of the German battleship column arrived at midnight at a point which had been passed barely a quarter of an hour earlier by the British, and, without anyone suspecting the connection, began to advance between the enemy battle fleet and the screen in rear of the latter. [Fig. 27.] Even at this time the light cruisers *Rostock*, *Stuttgart*, *Elbing*, and *Hamburg* had not yet succeeded in getting clear of their own battleships and resuming station ahead, and were on the port beam of the leading division and thus forming a sort of screen on the left flank so far as the battleships were concerned, but which was dangerous to the light cruisers in the event of contact with enemy forces. [Fig. 27–A. *Stuttgart* and *Hamburg* should be substituted for *Frankfurt* and *Pillau* in this figure.]

On the English side the Fourth Destroyer Flotilla, under Captain Wintour, following the flotilla leader *Tipperary*, was nearest to the German main body. About 7 miles to the eastward of this group was the force under Captain Farie, with the cruiser *Champion*, with seven destroyers of the Thirteenth and two of the Tenth Flotilla. (Thirteenth Flotilla: *Obdurate*, *Moresby*, *Nerissa*, *Narborough*, *Nicator*, *Pelican*, *Petard;* Tenth Flotilla: *Termagant*, *Turbulent*.) In the same latitude and close aboard the *Champion* on the port side were four destroyers of the Harwich Ninth Flotilla and one of the Tenth Flotilla. (Ninth Flotilla: *Lydiard*, *Liberty*, *Landrail*, *Laurel;* Tenth Flotilla: *Morris*. The *Moorsom* had been dispatched to port on account of lack of fuel as a result of a hit received in the daylight engagement.) On the other hand Captain Stirling, with the *Faulkner* leading the Twelfth Flotilla, was farther in rear to the northeastward, since the battleship division under Admiral Burney, which he was following, could not maintain speed owing to the damaging of the *Marlborough* in the day engagement and had gradually dropped to the rear. (Twelfth Flotilla: *Marksman*, *Obedient*, *Mindful*, *Marvel*, *Onslaught*, *Maenad*, *Narwhale*, *Nessus*, *Noble*, *Opal*, *Nonsuch*, *Menace*, *Munster* and *Mary Rose*.)

Such was the situation when toward 12.30, Captain Wintour, with the seven boats of the Fourth Flotilla, sighted to starboard the vague outlines of a line of large ships on southeasterly course which appeared to be drawing ahead of the destroyers. Whether these were friend or enemy was impossible to determine, and the flotilla maintained course for some minutes with the torpedo tubes ready to fire and trained out to starboard. On these ships all remained quiet, and

only when they had approached to within 1,000 meters and were about to cross the course of the destroyers did Captain Wintour venture to flash the recognition signal. A raging, rapid fire was the answer. The first salvo struck the *Tipperary* in the forecastle and one shell hit the main steam line, while this boat, the *Spitfire*, and three following destroyers turned away, firing torpedoes at 900 meters. The *Spitfire* was about to load for a second shot when further shells carried away the falls on the loading davits and the crew at the tube were killed. The *Broke*, flotilla leader of the Second Half Flotilla, not having been picked up by the enemy searchlight, approached for attack, and fired one torpedo. Turning with hard over rudder, this boat was nearly rammed by the ship astern, the *Achates*. The *Tipperary*, overwhelmed by a cascade of shell in the beams of the German searchlights, soon burst into flames, and as a terrible flaming torch, lighted the German fleet on its way; she was soon thereafter to be accompanied by others in distress. The *Garland* attempted to go alongside to rescue the crew of the *Tipperary*, but was driven off by the heavy enemy fire and turned away to the eastward. The other destroyers in the rear were still in doubt as to whether or not the First Half Flotilla had not accidently attacked British ships, until one of the German searchlights happened by chance to pass over its own line. This moment sufficed, however, to dispel all doubts. Passing the sinking *Tipperary*, the *Ambuscade* fired two torpedoes, and the boats astern also attacked, while the *Unity* lost contact; shortly thereafter an explosion was heard from the German column and a gap was noted in the previous unbroken line of searchlights directed at the destroyers. The flotilla had not chanced upon a screen but had been given an opportunity to attack the fleet itself such as had not been realized by the German flotillas at any time during the war.

But the British destroyer commanders, in spite of their bravery, showed themselves to be tactically unequal to the situation, while the torpedo defense of Battle Squadron I, after the long periods of training during peace time, showed no deficiencies. The first salvo fired by the *Westfalen* at 12.30 hit the forecastle of the *Tipperary* and carried away the bridge. At the same time the *Westfalen* turned to starboard eight points to avoid a torpedo fired by that ship and in five minutes fired ninety-two 15-cm. (6-inch) shells and forty-five 8.8-cm. (3.5-inch) shrapnel at ranges from 1,800 to 1,400 meters. On the bow of the enemy ship the number "G–60" was plainly discernible in the searchlight beam. The *Nassau*, *Rheinland*, *Rostock*, *Elbing*, and *Hamburg* and the *S–32* astern of the *Rostock* joined in this fire and opened on the enemy destroyers which were following, while the *Stuttgart* from a position to one side illuminated the targets with her searchlights and confirmed the

spotting observations. The *Tipperary* defended herself with noteworthy heroism, but the easily inflammable oil soon caused the British ship to be enveloped in a mass of flame, while one after another the ammunition cases exploded and shot after shot struck forward; the after gun fired to the last man. At this time the *Spitfire*, probably with other destroyers, approached to relieve the fire on their flotilla leader and opened fire with their guns on the German searchlights. From 12.30 to 12.36 a large number of shells struck near the forward stacks of the *Westfalen*, *Nassau*, and *Rheinland*, which put some of the searchlights out of action and caused a large number of casualties among the personnel on account of the splinters and shell fragments. On the signal bridge of the *Westfalen*, seven men, including the commanding officer, were slightly wounded and one severely wounded; on the *Nassau*, Captain Klappenbach, a shell killed 1 officer and 10 men; while on the *Rheinland*, Captain Rohart, as the result of a single hit, 10 men were killed and 20 wounded.

Another shell hitting the *Nassau* put two searchlights of the after group out of commission, while on the *Rheinland* a shell struck the armor of the conning tower without doing much damage. [This demonstrates the value of guns as well of torpedoes in night destroyer attacks.] But the *Spitfire* was also approaching destruction. Blinded by the flames from the flotilla leader, this ship realized too late that the three leading German battleships had resumed their original course. It was about 400 meters on the port beam of the *Nassau* on an opposite course, when the latter turned with hard over rudder toward the destroyer. The latter attempted to turn to starboard but was caught squarely by the stem of the battleship. The two vessels struck with a speed of 20 meters per second. The *Nassau* listed from 5° to 10° to starboard, so that the shell fired from the forward turret could only pass through the bridge and forward stacks without detonating. The blast was sufficient, however, to carry away the bridge, searchlight platform, and forward stack of the destroyer. Thirty-two men were killed and three wounded, while the bow was stove by the collision for 20 meters down to the second underwater bulkhead and caught afire. But in spite of all this the destroyer could be kept afloat contrary to expectation, and was finally able to return to port on her three remaining boilers. On the *Nassau* this boat was considered to have been sunk after she had left part of her bridge hanging to the torpedo net of the battleship and disappeared in the darkness after two heavy explosions. On the other hand, the battleship had suffered little damage: one 15-cm. casemate gun had been torn from its supports and a 3.5-meter hole made in the bow above the water line. Before this hole could be made water-tight the ship was reduced in speed to

15 knots and tried in vain to resume station between the *Westfalen* and the *Rheinland*.

In the meanwhile the German cruisers which were in between their own battleships and the enemy destroyers had become involved in a difficult situation. Forced to turn to starboard to avoid the torpedoes fired by the English they found their way blocked by Battle Squadron I. The *Rostock* was finally able to ease in between the *Nassau* and *Rheinland* when the latter gave way to starboard, but the *Elbing*, blocked by the *Stuttgart*, was forced to break through the line of battleships ahead of the *Posen* (Captain Lange). The latter ship realized too late the intention of the light cruiser in the confusion of the battle and was only able to ease the shock of the unavoidable collision. The *Elbing* was struck on the starboard quarter and disappeared rapidly from view. Although the shock of collision had been very slight, a leak commenced in the cruiser which soon filled both engine rooms. The lighting plant and steering engine were put out of commission, as well as all interior communications. The ship listed 18° and the port battery could only be made ready for action again after the ship had been put on an even keel by counter flooding. For the time being the cruiser drifted astern on the starboard side of the German line, unable to maneuver or fight. [The ease with which the *Elbing* sank is in sharp contrast to the sturdiness of the *Spitfire*. See note B, fig. 27–A.] The *S–32* had also received two direct hits, one of which carried away the main steam line, while the other detonated near the bridge, so that this destroyer lay disabled near one of the burning English ships. On the latter ship eight heavy explosions were noted. At 1.30 a. m. the *S–32* was again able to get her engines in condition for operation and using salt feed for the boilers attempted to escape on course east to the protection of the coast.

Meanwhile Vice Admiral Ehrhard Schmidt had withdrawn the unengaged ships of his squadron from the danger of torpedo attack by a simultaneous turn to course W. by S. But scarcely had the leading ships, *Westfalen* and *Rheinland*, resumed their previous course when they were forced to open fire with their port torpedo defense batteries. After the loss of the *Tipperary*, Commander Allen on the *Broke*, had noted that about six destroyers were still following his ship and had turned with these to course south. These destroyers were the *Sparrowhawk*, *Contest*, *Achates*, *Ambuscade*, *Ardent*, *Fortune*, and *Porpoise*. About five minutes after the first attack he noted a large vessel with two smokestacks and heavy boat cranes about six points to starboard which appeared to be about to cross the course of the flotilla. The recognition signal made by the *Broke* was answered by the flash of a number of searchlights and a hail of shell.

This was the cruiser *Rostock*, which was cruising about 1,000 meters on the port beam of the leading ship of Squadron I, and being the first ship to recognize the danger, opened fire at 12.40 a. m. at 1,600 to 1,400 meters. At 12.50 the *Rheinland* and the *Westfalen* joined in this fire. The latter fired thirteen 15-cm. shell at 1,400 meters, as well as thirteen 8.8 shrapnel, while the former fired at 800 meters on the second destroyer. Both ships turned with full speed to the westward to avoid torpedoes, but before the other ships could join in the fire the force of the destroyer attack had been broken. After only 45 seconds the forecastle and bridge of the leading boat were in flames. The *Broke* was therefore forced to turn off to port before she was able to fire a torpedo. The *Sparrowhawk* was approaching from this side, but before the left rudder could be eased a shell struck the bridge, killing the entire personnel at that station, while the engine telegraph failed and the rudder jammed. The *Sparrowhawk* then realized to her dismay that the *Broke* was headed directly for her at full speed. The *Sparrowhawk* was struck just forward of the bridge, the bow of the *Broke* passing through the hull to the center line. Both destroyers were hanging together in a helpless condition in the midst of the enemy fire, while 23 men from the *Sparrowhawk* jumped and were thrown over onto the *Broke* by the force of the collision. The other destroyers could avoid collision only by a hair's breadth, while the *Contest* was unable to sheer out and cut off 2 meters of the stern of the *Sparrowhawk*. Finally, the *Broke*, after suffering severe losses, was able to get clear and withdraw at slow speed to the northward out of the range of the enemy guns, while the *Sparrowhawk* drifted, disabled, to the northwest. In the blinding glare of the searchlights and the enemy shell the other destroyers were unable to obtain a clear estimate of the situation. Only one thing seemed certain. The leading German ships were of the *Westfalen* class and there could be no further doubt that the flotilla had made contact with the van of the German battle fleet as the latter was about to break through to the eastward in the wake of the British battleships. That the attack had not been entirely ineffective was shown by an explosion in the German line. But here again it was not a battleship but a light cruiser which had been hit. In the attempt to break through the line to starboard between the *Westfalen* and *Rheinland* to get clear of the line of fire of the latter, the cruiser *Rostock* had received two hits from gunfire and one torpedo hit. This torpedo, which was fortunately running on the surface, struck the cruiser in No. 4 boiler room. The steam lines were damaged, the lighting plant put out of action, and the steering engine failed, while a collision was only avoided by the fact that the battleships gave way to star-

board. The *Rostock* was able to reach a position of security. The turbines were forced to stop, two bottoms and three bunkers filled with water, and two firerooms were flooded. One compartment was drained immediately, but 930 tons of water remained in the ship. The ship listed 5° to port, and by intermittent stopping and going ahead was able to follow the main body slowly to the southward. [In fig. 27–A the *Rostock* was hit in the 11.45 encounter rather than the first action at 11.30. The loss of *Wiesbaden*, *Frauenlob*, *Elbing*, and *Rostock* would seem to show that the German light cruisers were less substantially built than the British ships of this type, which on many occasions suffered severe injuries without being lost.]

Meanwhile, after the collision between the *Broke* and the *Sparrowhawk*, the command of the Second Half Flotilla had devolved on Commander Hutchinson, on the *Achates*, and, followed by the *Ambuscade*, *Ardent*, *Fortune*, *Porpoise*, and *Garland*, he turned to the eastward and when about 3 miles from the point of the collision turned again to course south to regain contact with his own battle fleet. In this maneuver the *Contest*, with her bent over bow, had lost contact. The other destroyers were again approaching the head of the German column.

At 1 a. m. the *Westfalen* exchanged recognition signals with two light cruisers of Scouting Division IV and had to sheer out to allow these vessels to pass ahead. Shortly thereafter an enemy destroyer was sighted approaching on the port hand. The *Westfalen* made the recognition signal and, opening fire, turned sharply away to starboard with full speed. In the beam of the searchlights the number "30" was distinctly recognized. The first salvo carried away the bridge, the mast went by the board, and, after firing seven 15-cm. shells and eight 8.8 shrapnel in 28 seconds, the *Westfalen* was able to cease fire, as the destroyer was in flames and fire had been opened by the *Rheinland*. The latter also turned away, but was forced to cease fire when one of the German light cruisers came in the line of fire. At 1.13 a torpedo passed within 50 meters to one side of the *Rheinland*, while the *Posen*, *Oldenburg*, and *Helgoland* also joined in the fire on the three leading destroyers at 1,600 and 1,800 meters. Before these were shot into a disabled condition and passed out of sight in flames, two torpedoe tracks were sighted approaching the *Posen*, and the ship turned away. At the same time a shell struck the forward searchlight group on the *Oldenburg*. Shell fragments wounded the commanding officer, Captain Hopfner, killed the officer directing the fire of the secondary battery, Lieutenant Commander Rabius, the searchlight and signal officers, and four men, as well as wounding three other officers and nine men, including the helmsman and the watch officer who was standing in lee

of the conning tower. Splinters went through the sight slits of the fire-control station, and wounded two other men. The *Oldenburg* was in danger of collision with the ships ahead and astern, owing to the loss of the ship-control personnel, when the captain, bleeding profusely, jumped to the helm and brought the ship back on her course while the battery continued to fire uninterruptedly and finally sank the destroyer 30.

When the German ships opened with their torpedo defense fire shortly after 1 a. m., the *Achates* and *Ambuscade* turned on course east, the latter firing her third torpedo at the ships which were concentrating on the *Ardent*. On one of these ships a red flame was observed near the water line and soon after the searchlights were extinguished. Further, the *Garland* and *Ardent* fired at the same time one torpedo each at the leading German ships from a favorable position 1,800 meters on the port bow, while astern of these destroyers the *Fortune* and *Porpoise* lay in the midst of very heavy fire from the enemy capital ships. As the *Ardent* turned away to port and passed the *Fortune* the latter was in flames but was defending herself bravely by gunfire against the superior enemy forces. The *Porpoise* was struck by a shell at the same time. One torpedo air flask exploded, the main steam line was carried away, and the rudder and engine-room telegraphs failed to function, but the destroyer was able to find protection in the smoke and steam from the burning *Fortune* and, steaming slowly to N. by W., was able to draw out of range of the German gunfire. The *Garland* sought in vain to make contact with the other boats of this flotilla, which had now ceased to exist, and finally joined up with the *Contest*, which boat was, however, unable to make more than 20 knots.

Meanwhile the *Achates* and *Ambuscade*, thinking they were being pursued by enemy light cruisers, proceeded singly to the northward. What they mistook for an enemy cruiser was probably in reality none other than the *Black Prince*. In the day action this vessel had lost all contact with the First and Second Cruiser Squadrons after the sinking of the *Defence*, and, with much reduced speed, probably as the result of hits received, had followed the British battle fleet at a great distance astern and in this manner had run into the midst of the destroyer flotillas after dark. When this vessel sighted a long line of ships on the port beam she probably mistook them for ships of the British battle fleet and stood over to join forces with them. Never was an error to be more dearly paid for than in this case. While the leading battleships in the German column were engaged in driving off the attack of the Fourth Flotilla, the *Nassau*, which was pocketed on the port side of the column, sighted, together with the *Thuringen* soon after 1 a. m., a ship on the port beam with four stacks which did not answer the recognition signal but turned away to port. In the beams of the searchlights an enemy armored

cruiser was recognized distant 1,000 meters. The *Thuringen*, Capt. Hans Kuesel, immediately opened fire, and of 10 shots from the main battery, 27 from the secondary battery, and 24 from the torpedo defense battery, every shell made a hit. The shell tore through the ship from aft forward, while the latter was turning, and the British cruiser was unable to return the fire. Soon the flames from this ship reached the mastheads. At 1.07 the *Ostfriesland*, Captain von Natzner, joined in this fire, followed at 1.10 by the *Nassau*. At 1.15, when the *Friedrich der Grosse*, Captain Fuchs, opened fire, the ship was only a burning funeral pyre, a gruesome sight, blazing like a torch as it passed the line of German ships until, after several severe explosions, it finally went to the bottom with all hands. Thereupon the *Nassau* turned toward Battle Squadron III to avoid the wreck of the *Black Prince*. The *Kaiserin* was forced to sheer out and collision was only avoided by the *Nassau* going full speed astern; she was able later to join the column astern of the *Hessen*.

Now, however, a second torch flared up to port near the head of the battleship column. In the search for the other destroyers of the flotilla, the *Ardent*, the only remaining undamaged boat of that group, had sighted smoke clouds ahead on the starboard hand and had approached these at the same time as the *Black Prince*. Only when it was too late to get clear did this boat sight four German battleships approaching rapidly from the starboard side across and about to cross her course. With quick decision the destroyer advanced to attack and fired a torpedo at the leading ship while the explosions on the *Black Prince* were still resounding. The *Westfalen* was at the head of the column. At a range of 800 meters the searchlights of that battleship picked up the destroyer on the bow of which the number "78" was plainly visible. While still in the beam of light this boat flashed the British recognition signal by Morse code. The *Westfalen* turned away just as the torpedo was fired by the destroyer, while the first salvo fired at the same time carried away the bridge and forecastle of the *Ardent*. After firing the torpedo-defense battery for 4 minutes and 20 seconds, with an ammunition expenditure of twenty-two 15-cm. shell and eighteen 8.8 shrapnel, the destroyer was out of action. The boilers and steam lines of the *Ardent* were blown up, and while the battleship searchlights were extinguished and the ships vanished, the destroyer remained behind a total wreck.

Meanwhile, at 1.10 Commodore Heinrich, on his flagship *Regensburg* at the rear of the line, had sighted a burning ship drifting past and dispatched the *S–53*, *S–54*, and *G–88*, which were astern, to the wreck. While on this mission the *S–54* was called by the badly damaged *Rostock* and returned to the assistance of the latter vessel, while the *S–53* and *G–88* approached the British flotilla leader

Tipperary, which was a mass of flame from stem to stern. The *S–53* rescued nine English from a raft near the wreck, and when about to rejoin her own forces this boat sighted on the port hand ahead another craft which did not answer the recognition signal. The *S–53* was about to fire a torpedo when the suspected ship sent the following Morse signal: "Here, *Elbing*, am disabled, please come alongside." But before the destroyer could carry out this order a third ship was sighted to starboard which in the light of the searchlight beam was recognized as an English destroyer with four stacks. A shallow torpedo shot fired either by the *S–53* at 600 meters or *G–88* at 300 meters passed under this vessel without exploding, while the gunfire directed against it was returned only by a few scattered shots. This British destroyer which the Germans had sighted was the severely damaged flotilla leader *Broke*. Of the crew of this vessel 42 men were killed, 6 missing, 14 severely wounded, and 20 lightly wounded. But to the astonishment of the English, the German torpedo boats turned off after a few salvos in which the destroyer received two hits, and proceeding slowly to the northward, thus allowed the *Broke* to escape the destruction which was awaited as a certainty. The reason for this was that the Germans believed the *Broke* to be sinking and the *S–53* thought it essential to return to the assistance of the *Elbing* as soon as practicable. On her return this boat sighted a third enemy destroyer which had evidently been abandoned by the crew. While the *S–53* stood on toward the *Elbing* the *G–88* sought to sink this wreck by means of bombs. At this moment the *G*–88 was fired on from the rear by five destroyers which were approaching from both sides. As the *G–88* had no more torpedoes and was considerably reduced in speed she avoided an action and turned away, thereby losing contact with the *S–53* and the *Elbing*.

At the same time the *S–52*, Lieutenant Commander Ehrentraut, had made contact with enemy destroyers at the rear of the line. This boat, with the *V–28* and *S–51*, had been accompanying the fleet flagship, and at 11.50 p. m. had received orders, together with the other boats, to proceed to the assistance of the damaged battle cruiser *Lutzow*. But only the *S–52* had been able to carry out these orders. After searching in vain astern of the battleship column and to starboard for this cruiser, at 1.17 a. m. this boat sighted two groups of destroyers following a flotilla leader which were approaching on both sides on course south. The group to port opened fire, but the German boat was able to escape pursuit under the protection of a smoke screen at high speed, and reporting this contact by radio proceeded to the coast of Jutland. (According to the Jutland Dispatches, page 304, the *Castor* sighted a torpedo boat to starboard at

1.15 a. m. As soon as this was recognized as an enemy boat, the *Castor* turned toward it with the intention of ramming and opened fire. The boat was too quick with a counter maneuver and sheered out, under the fire of all guns, and was lost to view. In the belief that this boat had been sunk, the *Castor* turned again to a southerly course to rejoint the fleet.)

Those destroyers of the British Fourth Flotilla which had survived the last actions had been scattered in all directions and were out of action, so far as the further progress of the battle was concerned.

As the last destroyer of the Fourth Flotilla [the *Ardent*] went down, the rear ship of the *Marlborough* division in the British battle fleet was barely 4 miles to the southward of the head of the German battleship column, since the speed of the leading ship of that division had been so reduced as a result of the torpedo hits that the division had gradually dropped 6 miles astern of the other battleship columns. [Fig. 29. As already related, the contact of this division with the *Moltke*, note Z of this figure, occurred earlier in the evening.] Even the other British battleships had been able to observe to the NW. and astern the searchlight beams against the low-lying clouds and the flash of gunfire, without being able to determine the true meaning of these engagements. These ships had been so close to the engagements of their own light forces that the *Vanguard*, rear ship of the Fourth Squadron, thought that an attack was being made on the Second Squadron to port, while the *Thunderer*, rear ship of the Second Squadron, could have joined in the action with gunfire. This ship had withheld her fire in order not to betray the position of the British battle fleet.

The Fifth Battle Squadron had been even closer to the enemy, and these ships, followed by the light cruiser *Birmingham*, on the starboard beam of the *Marlborough* division, were almost hit by wide shots from the German battleships. Only the *Malaya* had an opportunity of recognizing these ships, when an explosion of a torpedo gave her the chance to distinguish a ship of the *Westfalen* class apparently on the same course as the British. The *Malaya*, however, neglected to report this important fact to the commander in chief. As a result, Admiral Jellicoe was forced to conclude from observations made on the *Iron Duke* that these actions were only attempts of the German flotillas to break through his screen in an effort to attack the battle fleet, since he had received advices from the Admiralty that the German flotillas had been ordered to attack since 10 p. m. Even on the receipt of an answer, to an inquiry directed to Commodore Hawksley on the *Castor*, stating that not only destroyers but enemy light cruisers had been engaged,

he held to his previous assumption that the latter had only attacked in order to assist the destroyers to break through the screen in rear of the battle fleet. He therefore remained in ignorance of the fact that in reality these actions involved the flanking screen of the German battle fleet and that this was a prelude to the attempt of the entire enemy fleet to break through the rear of the British fleet. However, since 10.41 he had been in receipt of an extremely important communication from the Admiralty which should have brought him to make the true assumption. At 10.06 the Admiralty had intercepted and deciphered a radio from Admiral Scheer ordering airship reconnaissance in the vicinity of Horn Reef for the following morning at daylight. From this it was evident that he himself expected to be in that locality at that time. As a result of further observations of German radio traffic the Admiralty was able to warn him at 10.55 that three destroyer flotillas had been dispatched to attack his fleet. But of even greater importance was the fact that at 10.14 another intercepted radio gave the exact course and speed which the German fleet proposed to maintain during the night. Thereupon, further observations enabled them to determine the exact position of the rear ships of the German battleship column at 10 p. m., and after transmitting this to the *Iron Duke* at 11.23, the Admiralty further compiled all the previous information obtained in one message which was transmitted at 11.41 to Admiral Jellicoe. This stated that the German fleet at 10.14 had received orders to steer course SSE. ¾ E., speed 16 knots, battle cruisers at the rear of the column. Although the objective, Horn Reef, was not mentioned in this dispatch, it was very evident from the course and the 10 p. m. position. (This information evidently was based on the deciphering of a message sent by Commodore Heinrich at 10.13 to Flotillas II and VI: "10 p. m. own main body rear ship 165 y lower. Course south." This message gave the position of the *Regensburg*. The true position of the rear ship was, however, some 10 miles more to the northward at that time, and this error was repeated in the information transmitted by the British Admiralty).

But just this position reported by the Admiralty, 56° 33′ N., 5° 30′ E., caused Admiral Jellicoe very properly to doubt the correctness of their information. [Note A, fig. 24, shows this position.] If this position were correct, then at 10 p. m. the German fleet must have been 10 miles to the SW. of the British advance squadrons at the time the latter changed course to south. But from reports from his own forces he knew that the German fleet at that time was to the northwestward of the *Iron Duke*. But even assuming that this reported position were correct and that meanwhile Admiral Scheer

had really steered the course ordered at 10.14, it was still incomprehensible why his own forces had then not made some report of contact with the enemy. [It is interesting that an innocent error in the original German message caused all this trouble for the British, and this suggests the possibility of sending false radio messages for the enemy to decipher; precautions would, of course, have to be taken to avoid deceiving our own forces.] After the actions with the screen had begun in the rear of the fleet, Admiral Jellicoe thought it impossible that Admiral Scheer would maintain the course reported in spite of the reports from the Admiralty, since this would lead him through the midst of the destroyer flotillas. If he actually did this, then in the opinion of the British commander in chief, the German fleet would certainly suffer severe losses. Therefore he held it more than probable that these actions between the light forces (as he assumed) would cause the German fleet to turn off to the north and westward. None of the reports received indicated with any clearness that German battle cruisers had joined in any of these engagements. Finally, at 12.38, Commodore Goodenough was able to report through the *Nottingham*, whose radio was still intact, that he had been engaged with enemy cruisers to the WSW. at 11.15. When, at the same time, another report was received from the *Birmingham* stating that battle cruisers, number unknown, probably enemy, had been sighted to the NW. on course south from her position (given as 56° 26′ N., 5° 42′ E.). Admiral Jellicoe saw in this only a further confirmation of his assumption that the German fleet was still to the westward, at least at the time given in the reports, and that they had not in the meantime taken a course toward Horn Reef. On account of the great reliability which had previously characterized the reports from the Second Light Cruiser Squadron, Admiral Jellicoe was inclined to place greater confidence in these last two radio messages than in the reports received from the Admiralty. Further reports were not received. Rather, after the sporadic actions in the past quarter of an hour, nothing broke the stillness of the night. This further strengthened Admiral Jellicoe in his assumption that the German fleet was still to the westward, while Admiral Beatty, steaming 15 miles ahead of the *Iron Duke* to starboard, was also certain that no attempt had been made by the enemy to break through to the eastward. He had therefore instructed the Third Light Cruiser Squadron to keep a sharp lookout to the northwestward.

It was still not too late for the British to halt the break through to the eastward, even after the destruction of the Fourth Flotilla, since the remainder of the British flotillas were still to the eastward and southeastward. But these flotillas had already become involved in

the previous engagements, since some of the German shell which passed over the Fourth Flotilla had struck amongst the neighboring Thirteenth Flotilla and some even near the Ninth and Tenth Flotillas. No better opportunity could have offered for these flotillas to make contact with the enemy battle fleet and then initiate a well-planned mass attack from both sides. Instead of this, Captain Farie, leading the Thirteenth Flotilla on the *Champion*, thought that his flotilla had already been discovered by the enemy and taken under fire, and finding himself hindered from attack by the Fourth Flotilla to starboard, he turned suddenly hard to port, followed by *Obdurate* and *Moresby*. This movement, which was made without signal, was not seen by the other boats of the flotilla, which, unaware of their error, maintained their course and finally fell in astern of the Ninth and Tenth Flotillas which were led by Commander Goldsmith on the *Lydiard*. (These destroyers were: *Nerissa*, *Termagant*, *Nicator*, *Narborough*, *Pelican*, *Petard*, and *Turbulent*.) Shortly before this the *Unity*, of the Fourth Flotilla, had also joined on astern of the *Laurel*, so that Commander Goldsmith, without being able to recognize this fact in the darkness, was now followed by 12 boats instead of the original 5 in his division. Unfortunately for the rear ships of this force, the involuntary leader was completely unaware of the situation. On sighting again a long line of ships to starboard at 12.30, the flotilla leader on the *Lydiard*, mistook these for his own battleships, and thought they were probably ships of the British Fifth Battle Squadron. He therefore turned to course SE. with the *Lydiard* at 12.40, followed by the other destroyers, to parallel the course of this assumed British battle squadron in order to increase speed to 30 knots and cut in ahead of the latter to regain station on the right flank. This maneuver would have succeeded had he reckoned on this longer line of destroyers instead of a line comprising only five boats. As it was the last four destroyers ran afoul of the head of the German column in attempting to cross over. The *Pelican* and *Narborough* had already crossed ahead when they sighted two ships to starboard which were mistaken for their own light cruisers and called by recognition signal. At that moment the *Pelican* was illuminated by a searchlight beam, which promptly lost the target again, but was able to find and hold the last two destroyers, *Petard* and *Turbulent*. In spite of this the *Petard* and *Turbulent* could not decide to turn to starboard and attack in passing. The *Petard* sighted the leading German ship at a distance of 400 to 500 meters, and being challenged could only answer by means of a battle lantern which betrayed the boat as an English destroyer. Her position was still excellent for a torpedo shot, but having fired all torpedoes the boat was forced to turn away and barely escaped being rammed by the bow of the

enemy ship. Thereupon this boat was held by the searchlights of two German ships which took it under fire. [Contact 8, fig. 28.] The first hit put the after gun and gun's crew out of action, the second penetrated the hull aft, the third broke the oil lines, causing a fire, while another shell showered the midships section with fragments and splinters. After the sixth hit the destroyer was able to escape.

On the German side the *Rheinland* had sighted a destroyer at 1.45, and thinking this boat was about to attack turned off to port. At 2.05 the *Westfalen* sighted a suspicious smoke cloud to starboard and at the same time two destroyers of a large type were sighted to port. Since the ship was apparently being attacked from both sides at the same time, there remained nothing for the commanding officer but to hold his course through the midst of these two groups. The boat ahead, *No. 606*, was barely able to clear the bow, and was then taken under fire by the starboard battery with thirteen 15-cm. shell and six 8.8 shrapnel, of which the first shot seemed to pierce the hull and stop the boat. Before this could be definitely determined the port battery opened on another destroyer with "27" marked on the bow. The latter turned to parallel course for fear of being rammed and steamed ahead of the battleship, so that the latter needed only to turn one point to starboard in order to complete the destruction of this boat with gunfire. The first salvo carried away the stern gun of the boat, together with the entire personnel serving it, while after the expenditure of nineteen 15-cm. shell and sixteen 8.8 shrapnel, the boilers of the destroyer exploded. With the sinking of this boat, the *Turbulent*, this action came to an end.

The Fourth Flotilla had been destroyed, the Eleventh driven off, and the Ninth and Tenth and a part of the Thirteenth Flotillas had broken through to the westward with some losses and without making an effective attack. The Twelfth Flotilla, led by the *Faulknor* and consisting of 15 destroyers, did not attack for the time being. As the *Champion*, *Obdurate*, and *Moresby* turned away to the eastward to avoid the gunfire this movement was followed by the *Faulknor* and the boats of that flotilla at 12.45. This flotilla was forced off on course NE. by the *Champion* and was unable to resume course south before 1.20. At this moment the German cruisers *Frankfurt* and *Pillau*, which had become separated from their own main body, stood in from starboard toward the *Menace* and *Nonsuch*, the two last boats of the flotilla. The *Menace* turned with hard-over rudder to escape being rammed, while the *Nonsuch* attempted to fire a torpedo, but owing to the heavy enemy fire was forced to steam full speed (33 knots) to the eastward to escape complete destruction, and in so doing lost further contact with her own

flotilla. In this manner the strong eastern group of destroyer flotillas was driven off from their favorable position before they had had an opportunity to attack the enemy battle fleet. The passage was clear for the German fleet. What Admiral Jellicoe had held to be impossible had become an accomplished fact.

In spite of the mass formation of destroyers astern of the British fleet, Admiral Scheer had pushed through the midst of this screen without the loss of a single ship while forcing this passage. All conditions for favorable night attack of destroyers existed, such as position, light, and weather. The ease with which the attacks were driven off, the small number of destroyers which actually came within the range of vision of the fleet, scarcely permitted Admiral Scheer to realize the extent of the danger which threatened the head of the German battleship column. Although the German coast stations had carefully observed and intercepted the British radio traffic during the battle, the decoding and deciphering of the messages took considerably longer than it did the British Admiralty. Thus the fact that the British commander in chief had employed his entire strength of destroyers as a screen in rear of the fleet, and that the head of his column had repeatedly run into this hornet's nest, as well as other extremely important facts, the knowledge of which would have been essential, were only learned by Admiral Scheer after his return to port. The slight results obtained and the relatively large losses of the British destroyer flotillas was all the more surprising in view of the existing situation. There was no lack of personal bravery on the part of the British flotilla leaders, and this was fully acknowledged by the Germans. As Captain Redlich, commanding the *Westfalen* and a specialist on this subject, wrote in his report: "All attacks of the British destroyers showed very little training in the methods of making the approach to attack, inability to estimate the situation and the counter maneuvers of the vessel attacked. All attacks were executed individually and after approach, and even though it is not in accordance with British tactics to fire during the approach, the destroyers came too close to the German ships before turning and were thus picked up and fired on before they were able to get into action." Commodore Michelsen, first leader of destroyers, who had observed the attacks from his flagship *Rostock*, stated that all attacks were made with noteworthy boldness, but with an audacity which indicated a lack of knowledge of the proper attack methods. To this fact he attributed the large losses sustained by the flotillas. No attack was observed from a position ahead of the ships attacked.

The angle of approach was too sharp in general: the night torpedo range of the British torpedoes was evidently very short, certainly not over 1,500 meters. A number of torpedoes had been

sighted close aboard the *Rostock* which had reached the limit of travel. In the opinion of the commanding officers and the chief of Flotilla VI, the use of a light fuel oil for boiler firing on these destroyers had proven fatal in some cases, since it was frequently observed after the first hits that fires broke out which could not be easily extinguished. On the English side the cause of the failure was attributed to the grouping of too large a number of destroyers together in one flotilla. No attempt was made to maintain contact in order that the individual destroyers might make a mass attack from both sides at the same time. But even in the incomplete manner in which these attacks were carried out, they would still have been very effective against a fleet which was not so carefully trained as the German in night attacks. Again, the German gunnery, expert tactics, presence of mind, and seamanship of the German leaders and commanding officers had triumphed in the difficult situation during the night engagements. The searchlight discipline, the firing of star shell, and the fire control of the German leading ships was a result of the long training in peace time undergone by Squadron I and had reached noteworthy heights. In particular the direction of the fire control by the gunnery officers of the *Westfalen*, Commander Rinsch, Lieutenant Commanders Paul Wolff and Fraudenberg, was very praiseworthy. It was due to these excellent attributes of the fleet that the break through to the eastward made by Admiral Scheer was accomplished with such slight loss. In the course of the night engagements the British lost four destroyers sunk, and three out of action, while the only damage inflicted by these flotillas was a certain amount of injury to the *Rostock*, which resulted in the loss of that vessel later on in the night. The capital ships remained intact. [The loss of the *Elbing* also should be counted.]

While the British destroyer flotillas without effort on their own part had been given a brilliant position for attack on the German battle fleet, the German flotillas, after the severe battles during the daylight engagement, had been forced to first find the British fleet. Since the conclusion of the day action had found these flotillas lost from all contact with the enemy, there was no point of departure which would serve as a fix to assist this search. There remained, therefore, no other course than to launch these attacks in the various sectors from ENE. to SW. in individual groups without the assistance of cruisers as flotilla leaders, and this in turn led to a wide dispersion of the destroyer forces. It was unfortunate that the strongest and fastest boats which comprised Flotilla II, and which had suffered least in the day engagements, with practically full allotment of torpedoes, should have been assigned the most unfavorable sector, ENE. to ESE., from the 9 p. m. position of the German fleet. Thus, this

flotilla advanced into empty space and soon after 1 a. m. returned to port around the Skagen. [This appears to have been a grave error, which might have cost the Germans dearly had the fleet action been renewed the next morning.] In the adjoining sector, ESE. to SE., there remained at 9.52 only the *V–69* and *V–46*, of the Twelfth Half Flotilla, after the *S–50* had dropped out. Although these boats had observed several night actions from a great distance at about 11.42, they did not encounter any enemy forces. The boats of the Eleventh Half Flotilla, which had only one remaining torpedo each, had joined forces with the *Rostock* immediately after the opening of the night action and following the flotilla leader had passed through between the units of the Battle Squadron III. On the other hand, Commodore Michelsen still retained in reserve the boats of the Flotilla IX which were still ready for action. This flotilla comprised the *V–30*, *S–34*, *S–33*, *S–36*, *V–26*, and *G–42* of Flotilla III. On the report of the enemy forces near the van at 10.37 these boats had been assigned a search sector from SSW. to SW., while between these and the Twelfth Half Flotilla, Flotillas V and VII, which were up to strength, were assigned the sectors from SSW. to S. by E., and from S. by E. to SE., respectively. Thus it occurred that in those sectors which were most favorable for sighting the enemy main body there were found the slowest destroyers of the coal-burning type. Of these forces Flotilla VII, under Commander Koch, had encountered the British Fourth Destroyer Flotilla at 11 p. m. and after passing around them had resumed its advance on course SSE. ½ E. At 12.55 the Fourteenth Half Flotilla had been detached to act singly and proceeded on course SE. by E., at 16 knots in order to increase the area covered by the search. When a third group of three boats was about to be detached from the flotilla at 1 a. m. for the same purpose to search on course S. by E. ½ E., a number of their own ships were sighted on the starboard bow engaged with enemy destroyers, and the flotilla leader decided to keep his forces concentrated rather than send his boats in between the lines of the forces engaged. Thereupon further heavy gunfire was heard to starboard, followed at times by severe explosions, but the enemy main body was not sighted.

In the light of subsequent events it would appear that Flotilla V under Commander Heinecke, which had started the search for the fleet at midnight, disposed in four groups on the general course S. ½ W., would have had the most favorable opportunity for accomplishing their mission. (This group comprised *G–11* flotilla leader; Ninth Half Flotilla: *V–1*, *V–4*, *V–6*, *V–2*, *V–3*; Tenth Half Flotilla: *G–8*, *G–7*, *V–5*, *G–9*, and *G–10*.) As with Flotilla VII, this group was able to steam nearly smokeless at only about

18 knots on account of the slacking of the fires, and thus the advance of the flotilla was extremely slow. Further, this flotilla, as well as the others, had received orders from Commodore Michelsen to rejoin the German fleet by 3 a. m. Errors in navigation and in the transmission of signals added to the difficulty. Thus, the search had scarcely been under way for half an hour when the *V–2*, *V–4*, *V–6*, *G–9*, and *G–10* left station on the western flank and swung on course SE., while the remaining groups at least held their course until 1.30 a. m. Therefore these boats had attained so little distance from their own fleet that they were in grave danger of becoming involved in the actions between the German fleet and the British Fourth Flotilla. At 12.35 one of the torpedoes probably fired during this action passed under the *G–11*. At 1.04 the *G–9* and *G–10* sighted a light cruiser three points on the port bow, which had four stacks and might have been the *Rostock* or an enemy cruiser, but before the doubt could be cleared up the vessel disappeared to the southward. Finally, this destroyer group was fired on by their own ships at 1.20 a. m., and 20 minutes later were able to close other boats of Flotilla IX. The latter group under the leadership of Commander Tillessen had been searching on bearing SW. by S. since 10.37, but not having sighted enemy ships had stood on course toward Horn Reef since 1 a. m. As a result of this chain of circumstances which were favorable for the British, their battle fleet was spared the test of a night torpedo attack which the Germans were forced to meet. Neither the German battle squadrons nor the flotillas were able to make contact with the British battle fleet during the night. That the German battle fleet need not have feared such a night engagement and that, with the British fleet in the night formation which they assumed, such an action would have been welcomed by the German commander is fully confirmed by Admiral Jellicoe's own acknowledgment of the German superiority in a night action.

Chapter 14

SKAGERRAK—LAST PHASE—JUNE 1, 1916

After the destruction of the *Black Prince* and the *Ardent* there was quiet in the German lines. Summer nights in these high latitudes are short. The dawn was not far off and after the night engagements just experienced, all was expectancy regarding the events the coming day would bring. As the dawn broke toward 3 a. m. the eastern horizon was clouded with the smoke of the advancing fleet drifting in that direction. At this time a light drizzling rain set in which restricted the visibility, while a strengthening SW. wind caused an increased seaway to delay the damaged and sinking ships on both sides. While the *Ardent* and *Fortune* had already sunk, the *Sparrowhawk* and *Tipperary* as well as the *Wiesbaden* farther northward were drifting helpless in the seaway, the *Lutzow*, *Elbing*, and *Rostock* as well as *Porpoise* and *Spitfire* were steaming slowly away from the scene of the night engagements. The other destroyers which had participated in the night attack had been scattered to the four winds and were seeking in vain to regain contact with their fleets.

Meanwhile the commanding officers of the battleships with the exception of the first division, had not been able to obtain an insight into the events which had transpired at the head of the column. In most cases they were unable to make out whether this had been an engagement of ship against ship or simply a number of destroyer attacks. Although several burning wrecks had drifted past the advancing column it was impossible to determine whether these were friend or enemy. On the other hand, thanks to the superb seamanship displayed, these ships had been able promptly to avoid every danger and to maintain station in the formation. Only the *Nassau*, after her collision with the *Spitfire*, had had to relinquish her original position in column and finally to sheer in between the *Hessen* and *Pommern*. Also the *Schlesien* and *Schleswig Holstein* after sheering out to avoid the broken down *Rostock* at 12.50 a. m. had taken position at the rear of the line astern of the *Derfflinger* and *Von der Tann*. But since 2 a. m. these ships had been steaming on the port side of the line in order to regain their proper station in the formation. Aside from this the formation of the fleet had remained undisturbed. All units were at their prescribed distance from the leading

ship, *Westfalen*, which after the last destroyer attacks, had resumed the base course SE. by S. to reach Horn Reef.

At dawn the boats of the German Flotillas IX and V rejoined the fleet after their futile attempt to locate the British main body and toward 3 a. m. the *V–2*, *V–4*, and *V–6* of the Ninth Half Flotilla were on the port beam of the *Westfalen* preparing to take station at the head of column, while the *Stuttgart* took over the screening of the flank. Further boats were expected to close the fleet to port, especially the boats of Flotilla VII. On the other hand further destroyer attacks were improbable with increasing daylight. But the British Twelfth Flotilla still stood between the German fleet and its objective—Horn Reef. This flotilla had been forced off to the northward and eastward by the *Champion* during the first attack of the British Fourth Flotilla and later by the *Frankfurt* and *Elbing*, so that the distance from its own fleet had been increased to about 30 miles when the flotilla finally returned to course south at 1.20 a. m. Still further to the eastward and northward, the *Champion* and the two destroyers of the Thirteenth Flotilla, *Obdurate* and *Moresby*, had returned to the southerly course at 1.05. All of these units were now rapidly approaching the German battle-fleet. Of these the closest unit was the *Faulknor*, leader of the Twelfth Flotilla under Captain Stirling. Astern of this vessel were the boats of the First Half Flotilla in double column. (First Division: *Obedient*, *Mindful*, *Marvel*, and *Onslaught*, to starboard; second division: *Maenad*, *Narwhal*, *Nessus*, and *Noble*, to port.) In the wake of these were the four boats of the Second Half Flotilla following the flotilla leader *Marksman*. (These were *Opal*, *Menace*, *Munster*, and *Mary Rose*.) Without counting the flotilla leaders, Captain Stirling therefore had under his command 12 of the latest and strongest destroyers, each equipped with four torpedoes and capable of 34 knots speed. (Of the other destroyers of the flotilla, the *Nonsuch* had lost contact, while the *Mischief* remained with the armored cruisers.)

At 2.45 a. m., as the first streaks of dawn lighted up the darkened horizon, Captain Stirling sighted to starboard a long line of battleships which he was able on closer approach to recognize as German ships. Thereupon, he turned to a parallel course at 25 knots and ordered the first division to attack. But scarcely had the approach for attack begun when the German ships, apparently noticing the movement, turned away and were lost to sight. The British flotilla commander believed, however, that these ships would soon thereafter return to their original course. He therefore ordered the first division to sheer into formation and steaming at full speed he proceeded on the assumed course of the enemy in order to attain a position ahead of the column. Meanwhile he found opportunity at

2.56 to send the following very important report by radio: "Enemy Battlefleet steering SE., bearing SW. My position 10 miles astern First Battle Squadron." On account of the great importance of this message it was repeated twice, but neither the fleet flagship nor any other receiving station acknowledged it. At about 3 a. m., the *Faulknor* turned 16 points to starboard in order to attack from a position ahead on the reverse course. This movement was followed only by the *Obedient*, *Marvel*, and *Onslaught*, while the *Mindful* remained behind on account of a casualty to one boiler [fig. 28–A]. The second division remained on the previous course because the *Macnad* leading the division thought that the torpedoes were to be fired on approach and had trained her tubes to starboard. Five minutes later, this division with the *Narwhal* was able to approach for attack with the first division.

Meanwhile the *Faulknor* with the three following destroyers had again sighted the enemy ships to port immediately after the turn, and was now able to distinguish clearly that these comprised five or six ships of the *Kaiser* and *Deutschland* class. The conditions for attack were excellent in so far as pertained to illumination and position of the flotilla. On the one hand, it was too light for the battleships to use their searchlights effectively while, on the other hand, it was sufficiently misty and dark for the destroyers to launch a surprise attack. In addition to this the German destroyers were just on the point of rejoining the fleet from both starboard and port flanks—a fact which the English did not know at the time. The attention of the fleet was focused particularly on the returning boats of Flotillas IX and V, with which recognition signals had just been exchanged. Although the *König* at the rear of Squadron III had sighted enemy destroyers to port at 2.47 and had taken them under fire, they remained in sight for only a minute and, turning off at full speed, were lost to view in the mists. When later the *Markgraf*, nearer the head of the line, sighted other destroyers on the port quarter near 3 a. m., this ship hesitated to open fire before the recognition signal had been answered, as there was still some doubt as to whether these were friend or enemy. The *Kronprinz* (Captain Feldt), next ship in column, was also unable to recognize these as enemy destroyers, when the *Grosser Kürfurst* (Captain Goette) counted six destroyers (four stacks) at 3.02 about one point forward of the port beam distant 1,400 to 1,600 meters, which were steaming to attack in column in close formation. The *Grosser Kürfurst* turned six points to starboard and opened fire on the second, third, and fifth destroyers. The *König* and *Deutschland* (Captain Meurer) could not distinguish these vessels on account of the smoke of the ships ahead, but turned to starboard and opened

fire, too late, however, to halt the attack. The *Faulknor* had already fired one torpedo at the second and one at the third ship in line. At 3.05 the *Obedient* also fired a torpedo at a ship of the *Kaiser* class, while straddling salvos struck near the destroyers. Between 3.05 and 3.08 the *Marvel* and *Onslaught* each fired four torpedoes, some of which were still set for short-range shots. At the same time the *Mindful*, which was still approaching for attack, sighted the enemy and turned to fire, but was forced to sheer off to clear the destroyers which were returning from attack and could not therefore get off her torpedo shot. The latter force observed at 3.10 that one torpedo detonated in the wake of the second smokestack of one of the enemy battleships and a distinct explosion was heard. At this moment the *Obedient* fired another torpedo at one of the older battleships. Thereupon, all destroyers turned away under cover of a heavy smoke screen.

Meanwhile the torpedoes had reached the German line. One of them passed close to the bow of the *Grosser Kürfurst*, while a second detonated about 100 meters astern in the wake of the *Kronprinz*. Two torpedo tracks were observed in the director telescope of the *Markgraf*. The ship turned off, one torpedo passing about 30 meters ahead and another under the ship without detonating. At 3.07 the *Hessen* (Captain Bartels) was forced to turn out to avoid a torpedo while opening fire on the destroyers. At 3.10 the *Pommern* (Captain Bolken) was hit by one or two torpedoes. Shortly thereafter, there followed a series of explosions in quick succession, each one accompanied by clouds of smoke. Evidently the hits had occasioned the explosion of a part of the ship's ammunition. Then the flames spread rapidly over the entire ship reaching as high as the mastheads. The *Pommern* broke in two while parts of the wreckage were thrown high in the air, and as the *Hannover* passed to starboard of the floating stern of that ship, this part capsized, the rudder and propellers being visible high in the air for a moment before sinking.

While the *Hannover* was still turning out, a torpedo approached from port and passed close under the stern. The *Hannover* turned further with all speed to starboard, and a few minutes later felt a heavy shock as though a submarine had been rammed under water. The ships astern of the *Pommern* were still under the impression that the former vessel had been blown up by a mine or submarine, when the *Nassau*, then the *Schlesien* and *Schleswig Holstein* made out the faint outlines of three or four destroyers through the smoke and mists to port. These were taken under fire but soon disappeared. Promptly realizing the danger these ships all turned eight points to starboard, but one torpedo passed the *Nassau* close to the bow, while another passed clear astern; these were the third and fourth torpedoes

which had endangered the ship during this night. The *Schlesien* (Captain Behncke) was forced to sheer out to avoid torpedoes, while the *Schleswig Holstein* (Captain Varrentrapp) maintained course and at 3.12 opened fire on the enemy destroyers at 1,500 meters. The latter turned away. But the second salvo fired at 1,000 meters apparently made three hits on the last destroyer which commenced to burn. Thereupon all boats disappeared in the smoke from the battleships which were drifting toward them.

As a matter of fact one shell had struck the *Onslaught* at this time, wrecking the bridge and chart house, killing among others the executive officer, mortally wounding the commanding officer, setting fire to all ammunition and destroying all the navigational equipment of the ship. Thereupon this vessel closed the *Mindful* and at 3.20 the division turned to port on to course south in order to regain contact, but lost it again as they were forced to turn off, thinking they were being pursued by enemy cruisers.

About 10 minutes after the *Faulknor*, the *Maenad* and the *Narwhal* also approached for attack and at 3.20 each fired 2 torpedoes at about 2,700 meters, whereupon, the *Maenad*, not satisfied with this success, although a hit was believed to have been observed, turned again and swinging the tubes to starboard fired her 2 last torpedoes at 3,700 meters. But these also missed, although the destroyer thought that a heavy explosion had occurred near the fourth ship of the German line.

It is difficult to say where the other destroyers of the flotilla remained during the attack of the first division. In any event none of them fired their torpedoes. Evidently, they had turned away under the heavy torpedo-defense fire and believing themselves followed by enemy ships had lost contact with the *Marksman*, leader of the third division, and the destroyers following her.

Meanwhile the sound of gunfire had drawn on the *Champion*, which with the destroyers *Obdurate* and *Morseby*, was some three miles further to the eastward. These vessels had, therefore, turned to course west at 3.14, encountered the *Marksman* and *Maenad*, and turned with them to course south at 3.25. At this time a few large ships were distinctly sighted to the southward whereupon the *Marksman* inquired of the *Champion* if they were German or British ships. The answer was, "German, I believe." The *Champion* held course toward these ships for some minutes and then at 3.34 turned suddenly to the eastward without any apparent reason. The last destroyer *Morseby*, under Lieutenant Commander Alison, was the only one which did not follow this change of course. At 3.35 he sighted four ships on course SE., distant 3,700 meters which he recognized as older type battleships. Making signal that the enemy was to the westward, he turned with hard left rudder to make the

approach for attack, and at 3.37 fired a torpedo set to run at high speed. Soon after this the *Schleswig Holstein* sighted a few scattered destroyers to port which turned away before they could be taken under fire. At 3.42 the *Von der Tann* turned out to avoid a torpedo, while the *Moresby* certain that a hit had been made, turned off to rejoin the *Champion.*

Meanwhile an incident occurred near the head of the German column which can not be fully explained. The occasion of the action near the rear of the line was not clear to the leading ships in column as no enemy vessels could be sighted from that position. These ships had, therefore, maintained their previous course, while the *V–2*, *V–4*, *and V–6* of Flotilla V, under Lieutenant Commander Hoefer, were steaming up towards the head of column. They were about 200 meters abeam of the *Westfalen* and *Rheinland*, when at 3.15, or five minutes after the explosion on the *Pommern*, a sudden explosion occurred on the *V–4* (Lieutenant Commander Barop). The whole fore part of the boat was torn off and emerged for a few minutes astern of the rest of the vessel. Since no enemy vessel was in the vicinity at the time, it was supposed at first that the boat had struck a mine or had been hit by a submarine. The *V–2* and *V–6* went alongside the projecting stern of the sinking boat and rescued the wounded and survivors; a difficult task in the heavy seaway. Seventeen men were killed and two severely wounded. Since Battle Squadron II at that time opened fire on enemy vessels to port, the wreckage which was still floating was sunk by gunfire and a torpedo fired by the *V–6*. Whether the first explosion on the *V–4* was due to a drifting mine or a torpedo which happened to be floating at that place or to one of the boat's own torpedoes has never been fully determined. It can only be stated with certainty that the loss was not due directly to the attack of the British Twelfth Flotilla. Further, the attack of this flotilla showed what might have been accomplished by the other British flotillas had they been led in such a brilliant manner as the Twelfth and had fired, not on the approach, but in passing the enemy ships.

But even this attack had certainly not fulfilled the hope which Admiral Jellicoe had expected from the night attacks of these destroyer flotillas. On the contrary, instead of splitting up the German fleet and driving them off to the westward, these flotillas had been unable to prevent the bold break through toward Horn Reef, and instead had themselves been scattered in all directions. Although Captain Stirling, commanding the Twelfth Flotilla, had attempted at 2.56 during the progress of the attack, to report to the commander in chief by urgent radio that he had encountered enemy battleships 10 miles in rear of the first battle squadron, and soon thereafter that he was about to attack while the enemy turned

to course SSW.; these signals were picked up by the *Marksman* only and not at all by the fleet flagship, thanks to the good interference of the German radio stations, although both messages were repeated. (In reality the distance of the *Faulknor* from her own fleet at the time these signals were sent was considerably greater than reported, being about 25 miles.) But even though Admiral Jellicoe had received this message of the Twelfth Flotilla, this would not have effected the further course of events, since the last opportunity to cut off the German fleet from Horn Reef had already passed. At all events the British commander in chief was not aware that the latter had been successful in breaking through, and furthermore, since no reports had been received since 12.30 regarding the movements of the enemy fleet, he was forced to conclude they were steaming astern of the British fleet to the southward. No reports had been received from his light cruisers or destroyers, nor had the admiralty sent further information concerning intercepted German messages pertaining to the fleet movements, which might have thrown light on his erroneous assumptions. He was, therefore, still of the opinion that the German fleet would certainly be sighted shortly after daylight. At 3 a. m. he decided in the absence of further reports of the enemy within the next half hour to countermarch to course north to meet them.

At 3.15 he, therefore, dispatched a radio directing the squadrons to turn to the reverse course at 3.30 and to form battle line in column on course north. But although Admiral Jellicoe believed that the German fleet was still to the northward, Admiral Beatty held a different opinion. The latter had seen nothing of the night engagements which had occurred at the rear of the fleet. At the conclusion of the daylight action the German forces had been to the westward of the British Battle Cruiser Fleet. Consequently its commander believed that the principal danger lay in the chance that the German fleet might succeed in regaining their bases by hauling around to the southward and westward of the battle cruisers during the early morning hours. In order to prevent this he was about to request permission of the commander in chief to scout to the SW., when he received orders at 3.22 to stand on course north and close the battle fleet.

The one assumption was as erroneous as the other. The keen decision of the German commander to break through towards Horn Reef without regard for the opposing forces between the fleet and its objective did not come within the calculations of any of the British commanders. While these officers suspected the German fleet to be to the northward, westward, or southwestward of the British, the former was in reality about 16 miles to the westward of Horn Reef Lightship at 3.30 a. m. and about 30 miles NE. of

the *Iron Duke*. On the other hand, the battleship division under Admiral Burney, which was reduced in speed on account of the *Marlborough*, had fallen behind the other columns about 12 miles, and was only about 15 miles to the southeastward of the German van. The fact that this division had dropped astern was only known to the fleet at daylight when the *Marlborough* reported by radio at 2.56 that the ship could not make over 12 knots, while the other ships of the division, *Revenge*, *Hercules*, and *Agincourt* had continued at 17 knots. At 3.39 the British main body which was to the southward turned to course north in compliance with the orders received in the meantime. This force, led by the *King George V*, consisted of the Second and Fourth Battle Squadrons and the Fifth Division. At 3.44 the Fifth Battle Squadron, which was some miles to the northward of the head of the battleship column, also turned to the northward, as did the battle cruiser fleet, which was 15 miles WSW. of the battle fleet; at 3.55 the three remaining ships of the Sixth Division also turned to the reverse course.

Meanwhile the light cruiser *Fearless*, which had lost contact with the First Destroyer Flotilla during the day action on account of reduced speed, came in sight in the dawn astern of the *Marlborough* and taking Admiral Burney and his staff aboard transferred the latter to the *Revenge*. Thus at 4.35 that officer hoisted his flag on board the *Revenge* and again took over the command of his division. Soon thereafter the *Faulknor*, flotilla leader of the Twelfth Flotilla, accompanied by the destroyers *Obedient* and *Marvel* joined these ships. Thereupon Admiral Burney, under instructions from the commander in chief, sent the *Fearless* back to the *Marlborough* to escort the latter vessel to Rosyth or the Tyne, while he rejoined the fleet with the rest of the sixth division. But much more serious was the fact that aside from the Fourth Light Cruiser Squadron, none of the light cruisers or destroyers had as yet been able to rejoin the fleet. At daylight, therefore, Admiral Jellicoe was disagreeably surprised to find himself not only deprived of a whole battleship division but of the destroyer and cruiser screen as well; and this, in a zone which he believed to be fully controlled by German submarines. Even though during the night he might have considered continuing the advance toward Horn Reef in case the enemy were not sighted by daylight, he did not now hold to this decision, but decided to hold course to the northward until these missing forces, particularly the destroyer flotillas, were able to close the fleet. That this decision meant renouncing all hope of bringing the enemy fleet to battle again was not apparent to the British commander at the time: rather, he still hoped to stand between the enemy and their base. He expected

to make contact again with the enemy at any moment. In spite of the danger from submarines and the lack of vessels to form an antisubmarine screen, he placed the fleet in single column in order to be prepared for an attack of the German fleet if suddenly sighted under the prevalent 3 to 4 mile visibility. This did not occur, but neither did the British Battle Cruiser Fleet, the light cruisers, or destroyer flotillas or the ships of the sixth division come in sight. (The errors in dead reckoning positions which were constantly increasing make it particularly difficult to collect the forces. Thus the *Hercules* determined by a sight of the sun that the difference between the true position and the dead reckoning position was almost 30 miles. Von Schoultz: With the Grand Fleet in the World War, p. 191.)

For a while the hope was entertained that Commodore Tyrwhitt might join the fleet with the Harwich Force and thus make up for the sudden lack of destroyers and light cruisers. The latter was still at anchor at Harwich, however, much against his will, since the Admiralty was still uncertain whether or not the entire German High Seas Fleet had participated in the action and wished to maintain certain reserve forces in the event of other detachments of German forces advancing into the channel during the battle. But even had the Admiralty been less cautious and had dispatched this force to the scene of action on receipt of the message that a battle was pending, it would have had no further effect on the outcome. Admiral Tyrwhitt's cruisers and destroyers would have been unable to join the fleet before 6 a. m., without steaming at such high speed as to consume all the fuel on board these ships.

Meanwhile minute after minute passed since the countermarch of the fleet to the northward had been initiated without the British commander receiving any reports concerning the position or movements of the German fleet to relieve the paralyzing uncertainty which was oppressing him. With the decreasing visibility, the chances of still encountering the German fleet diminished until finally there appeared to be no other course to pursue than possibly to capture one or more of the disabled enemy vessels. A clue for this search was given by a message sent at 2.48, which was intercepted by the Admiralty at about 4 a. m. in which a disabled German ship, probably *Lutzow*, was reported at 11 p. m. in 56–26 N., 5°–41 E., on course south, speed 7 knots. Admiral Jellicoe, therefore, ordered a sharp lookout kept for this vessel. In this, however, he was simply chasing a phantom, since the *Lutzow* had meanwhile been sunk by her own crew while about 60 miles NW. of Horn Reef [fig. 24].

Although up to midnight the hope of bringing this damaged cruiser into port had persisted, the large volume of water which

had entered the ship was exerting such a pressure on the bulkheads that the latter could not be expected to hold. At 1 a. m. the pumps on the drains were unable to keep the water from the electric plant forward, and the crew were forced to rely on the auxiliary lighting system to continue work. Soon the forward turret was awash and the water began to penetrate the forward fire rooms. An attempt to steer the ship astern in order to relieve the pressure on the bulkheads had to be abandoned as the propellers were out of water and the bow was drawing 17 meters. Finally, calculations showed that there were about 8,000 tons of water in the hull of the ship, and Captain Harder, commanding officer, decided with a heavy heart to abandon ship and at least rescue the crew, since the ship was in danger of capsizing any minute. At 2.20, the engine room received order to haul fires, the crew assembled on the quarter-deck, while the *G–37*, *G–38*, *G–40*, and *V–45*, which had escorted the ship since the conclusion of the day engagement, went alongside. Thereupon the crew, after giving three "hurras" for His Majesty the Kaiser and the *Lutzow*, left the sinking ship in perfect order and quiet, wounded first. At 2.45 the ship was down in the water up to the bridge, and after two torpedoes fired by the *G–38* under orders from the commanding officer of the *Lutzow*, the battle cruiser disappeared under the waves. Thereupon the destroyers overcrowded with men started the return journey towards Horn Reef. If anything could compensate the commanding officer for the loss of his ship it was, as he stated in his report, "the splendid example of military discipline displayed by those under his command, which would leave in his heart the inextinguishable pride of having been permitted to command them."

Strange to say the *Wiesbaden*, which was drifting as a complete wreck near the scene of the day's engagement, had still held together. But at about the same time that the *Lutzow* went down this vessel turned slowly on its side, and sank. Only one man, Fireman First Class Zenne, survived the loss of this unfortunate vessel.

On the other hand the crews of the *Elbing* and *Rostock* were still fighting desperately to maintain the buoyancy of their ships, and if possible to bring them safely to port. Hit by the *Posen's* bow the *Elbing*, Captain Madlung, lay since 12.30 about 30 miles to the southward of the place where the *Lutzow* later sunk. The engine rooms were completely flooded, and there was no further possibility of getting the turbines in operating condition. When the *S–53* came alongside shortly after 2 a. m. the commanding officer permitted all hands to abandon ship with the exception of the executive officer, the torpedo officer, a squad to blow up the ship, and one cutter crew. At 2.25 the *S–53* stood clear with 477 men

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aboard, including 9 prisoners from a British destroyer, and steered for the Danish coast at full speed. Meanwhile Captain Madlung with those remaining aboard rigged a small sail with great difficulty, and attempted to take advantage of the prevalent favorable breeze to bring the ship toward the coast to the eastward, where he hoped to receive help from the home bases. Toward 3 a. m. he sighted a number of enemy destroyers to the southward, and gave orders to blow up the cruiser. In the immediate vicinity, however, was the British destroyer *Tipperary*, which was on the point of sinking herself, and which witnessed the sinking of the German cruiser. But other British ships must have been near by; for scarcely had Captain Madlung left the ship in the cutter with the remainder of the crew when a cruiser or destroyer approaching from the other side fired a number of salvos at the German ship. Thereupon the cutter fished out of the water the completely exhausted medical officer of the *Tipperary*. One hundred meters further on the cutter came upon about 100 English seamen, some of whom were on a raft, while others were drifting in the water, and calling for assistance. These were the survivors of the *Tipperary*, which sank at 2.45 a. m. At great danger to himself and his crew Captain Madlung had blue lights burned to call attention of the passing British ship to these men in the water. Five hours later the crew of the German cutter was picked up by the Dutch fishing steamer *Kjmuiden 125*, and taken to Holland.

The *Rostock*, Captain Feldmann, with Commodore Michelsen aboard, was able to keep afloat longer than either the *Elbing* or the *Lutzow*. After receiving a torpedo hit at 12.30 the commanding officer attempted to steer for the German Bight, about 50 miles to the westward of Horn Reef on course south, but on account of the salting of the boiler feed water, was forced to stop his turbines. After a time it was possible to start them again, and in tow of the *S–54*, which had remained behind as escort, to make as much as 10 knots. At 3.25 the *V–71* and *V–73*, which had been dispatched by Commodore Heinrich to assist this vessel, arrived on the scene and formed an antisubmarine screen for the protection of the disabled cruiser.

Meanwhile another destroyer, *S–32* (Lieutenant Commander Froehlich), which had participated in the same engagement as the *Rostock* and received two hits, had sought protection near the coast on course east, although frequently obliged to stop enroute. At 1.45 this boat sighted an enemy cruiser of the *Aurora* type, and again at 2.55 encountered several English destroyers, but contrary to expectation was able to avoid both of these enemy forces and at 4 a. m. had reached a position about 40 miles to the westward of Lyngvig.

The *G–40*, *G–38*, *G–37*, and *V–45*, however, which were carrying the crew of the *Lutzow* in addition to their regular complement, were twice more engaged in battle. At 3.20, while about 35 miles to the northwestward of Horn Reef Lightship, they sighted two English destroyers in the early dawn bearing SSW. and steaming at high speed on a westerly course. These were probably the same craft sighted by the *S–32*, and were in fact the destroyers *Garland* and *Contest*, which were searching for the other boats of the British Fourth Flotilla. Although the German boats were considerably handicapped in the use of their armament by the extra personnel on board, the leader of the group, Lieut. Commander Richard Beitzen, decided to engage these enemy destroyers by a surprise attack with shallow torpedo shots. (*G–40* carried 260 men, including 30 wounded; *G–38*, the commanding officer, 15 officers, and 50 men, including 12 severely wounded; the *G–37*, 500 men, and the *V–45*, 215 men from the Lutzow.) The destroyers passed so quickly, however, that only the *V–45* was able at 3.30 to fire a torpedo at 3,000 meters, while in passing a lively artillery duel ensued at from 1,200 to 4,000 meters before the enemy destroyers were lost to view.

It was now so light that at 4.20 the German boats, while 15 miles NW. of Horn Reef, were able to sight further enemy craft about 4 points on the starboard bow. These were made out as one cruiser followed by four destroyers on the opposite course. The cruiser was the *Champion*, leader of the Thirteenth Flotilla, followed by the *Obdurate*, *Maenad*, *Marksman*, and *Moresby*, which had turned to the northward to follow the movements of their own fleet shortly after the attack made by the *Moresby*. On the other side of these vessels Lieutenant Commander Von Trotha believed he saw seven or eight larger men of war for a short time. The situation had now become critical for the German boats. Toward the south and southeastward the passage was barred by enemy forces. If the boats turned off to the NE. or NW. they would soon fall a victim to the superior speed and numerical superiority of the enemy. For Lieutenant Commander Beitzen there was therefore only one decision: To attack the enemy, which was now only 4,000 meters distant, without regard for the consequences and fight his passage through toward Horn Reef. This was successful. The boats turned toward the enemy detachment under a heavy gunfire and at 4.30 the *G–40* and *V–45* each fired two torpedoes at 2,500 and 2,200 meters, following which a fire was observed to break out on the cruiser, while a severe explosion occurred near one of the destroyers. The enemy vessels turned off and did not take up the pursuit of the German boats. Although the *G–40* had received a hit near the after turbine, it was able to continue at 26 knots for about 10 minutes in spite of

the danger from the escaping steam, when it was forced to stop and be taken in tow by the other destroyers. A leak from a hole 1.5 meters in diameter was stopped after listing the ship to port. As a result of the heavy seas the tow line broke seven times before the vessel was finally able to reach port.

The *Rostock*, in tow of the *S–54*, was in a fair way to reach port, when at 4.55 two enemy cruisers were sighted to the SW., distant about 8,000 meters. Although these vessels both turned away the German cruisers soon thereafter received a radio message from the airship *L–11* stating that an enemy squadron was advancing toward the square in which the *Rostock* was located. Thus the fate of the cruiser was sealed. In order to prevent the crew from being taken prisoner or sacrificed in a hopeless engagement, Commodore Michelsen called the destroyers alongside. They were successful in deceiving the enemy with the English recognition signal and a smoke screen until the crew had been transferred to the destroyers and all necessary preparations had been made for blowing up the ship. The *V–71* and *V–73* then fired torpedoes into the ship to expedite the sinking, and at 5.25 the destroyers were able to withdraw toward the German coast before the enemy ships had fired a shot.

The enemy ships which were sighted were apparently the van of the British fleet. Shortly before this hope had again been revived in the British fleet that German ships might still be encountered, when toward 4.40 a. m. the sound of heavy gunfire was heard from the SSW. which was increasing in intensity. At first it was believed that this could have but one meaning, namely, that Admiral Beatty, who was known to be in that vicinity with the battle cruisers, had again encountered enemy ships. At 4.42 Admiral Jellicoe therefore turned the fleet in column of divisions sharply toward the sound of gunfire in readiness to resume the action with the fleet should opportunity offer. A further disillusion was in store for him, however, as the gunfire proved shortly to have been caused by the appearance of an airship which the *Indomitable* and the vessels of the Third Light Cruiser Squadron had taken under fire and driven off. At the same time the airship came in sight from the fleet and was taken under fire for about three minutes by the entire fleet, whereupon it disappeared in the clouds without apparently having sustained any damage.

It now stood to reason that Admiral Scheer would be fully informed by the airship as to the course and position of the British fleet while the latter remained still in ignorance as to the whereabouts of the German fleet. Although Captain Stirling had now rejoined Admiral Burney's division with some of the destroyers of the Twelfth Flotilla and had reported that at 3 a. m. he had made a successful attack on a part of the German fleet consisting of six ships

of the *Kaiser* class and three cruisers and that these had last been seen on course SW., Admiral Jellicoe was not yet in receipt of this information. Toward 5.15, however, he received a message from the Admiralty which completely cleared up the situation. This message had been dispatched at 4.29 and received on board the *Iron Duke* at 4.55. It contained the completely unexpected and astounding information that the German High Seas Fleet was 17 miles distant from Horn Reef at 3.30 a. m. and was on course SE. by S., speed 16 knots. With the receipt of this message the last hope of Admiral Jellicoe of establishing contact with the enemy vanished. But Admiral Beatty, in ignorance of this last message, still retained the previous assumption that the enemy might be found to the west or southwest. He believed, therefore, that the course of the British fleet to the northward could lead to nothing. (Admiral Beatty had further received a report from the cruiser *Birmingham* at 12.30 in which it was stated that enemy battle cruisers had been sighted. Due to an error in the receipt of this message the course was taken to be WSW. instead of south as reported, and this error had naturally strengthened Admiral Beatty in his assumption that the British battle cruisers were between the enemy and their base.)

At 4.05 he, therefore, requested authority by radio, which was frequently interrupted by German interference, to continue to scout toward the southwest. (The *Lion* received the message from the Admiralty relayed through the *New Zealand* at 4.54.) The situation being cleared for Admiral Jellicoe by this last radio from the Admiralty, he could not agree to the proposal made by Admiral Beatty. But even though Admiral Beatty must have received the message from the Admiralty, it was difficult for him to place complete confidence in this report and to agree with the conclusion that the German fleet had been successful in breaking through to Horn Reef. In any event, he disposed his light forces on a scouting line to the westward during his advance to the northward in order that he might keep a sharp lookout on this bearing. At 5.30 he was so little convinced of the change in the situation that he sent the following message to enliven the personnel under his command: "Yesterday losses were severe on both sides. We hope to cut off the entire German fleet and defeat them. Every man must do his utmost. The *Lutzow* is sinking and another German battle cruiser is assumed also to have been sunk." (Jutland Dispatches, p. 488.)

This hope expressed with such confidence could not, however, be shared by Admiral Jellicoe. Better than the commander of the battle cruiser fleet he realized the bitter truth that the opportunity to

bring the great numerical superiority of the British fleet to bear, once lost, was not easily to be regained. For the second time Admiral Scheer had accomplished what the enemy had deemed impossible and had shattered all their well-laid plans. The German fleet had broken through to Horn Reef and the enemy could not risk pursuit in that area.

Although Admiral Jellicoe had received a dispatch from the Admiralty at 4.20 stating that the decision had been reached to permit Commodore Tyrwhitt to reinforce the fleet with 5 cruisers and 13 destroyers, even had this force been able to close the Grand Fleet an hour before the time when they actually left port on this mission, their influence would not have materially altered the course of events. The commander in chief then considered the battle formation of the fleet in column to be useless, and in view of the danger of submarines he formed the fleet in line of squadrons at 5.30. Thereupon the battle cruiser fleet was sighted from the left flank division and at 5.40 Admiral Beatty received the following signal from the *Iron Duke:*

"The enemy fleet has returned to port, search for the *Lutzow*."

Taken literally, this message considerably anticipated the true state of affairs, as the German fleet was 15 miles to the westward of Horn Reef at 4 a. m., about to form in battle formation, while Admiral Scheer was attempting to make an estimate of the situation based on the incoming reports. At 10 p. m. on the previous evening he had sent a message to the commander airship detachment stating that air reconnaissance was urgently desired in the early morning near Horn Reef. This dispatch had, however, not been received by the station intended, probably owing to the strong enemy interference. However, Commander Strasser had on his own initiative and in accordance with the developments of the situation issued instructions for the five airships to cruise at dawn through the North Sea and toward Skagerrak in the same manner as prescribed for May 31. The weather conditions being more favorable than on the previous day, the *L–11*, *L–13*, *L–17*, *L–22*, and *L–24* were able to ascend toward midnight followed at 2.30 a. m. by the *L–13*. Since, however, the visibility conditions were extremely poor, these airships were unable to render the surface craft their full effectiveness as a scouting force. Although the *L–24* and *L–22* advancing to the northward sighted searchlights and heard gunfire and explosions between 1 and 2 a. m. about 35 miles NW. of Horn Reef, they were unable to obtain a comprehensive view of the tactical situation.

Then at 3 a. m. the *L–22* was forced to abandon further operations since a fresh SW. wind carried the ship so far to the eastward that the ship was 70 miles WNW. of Lyngvig. Meanwhile the *L–24* cruised on the line between Ryvingen and Hanstholm to cover the

rear of the fleet. In proceeding to this station this airship was fired on by several surface craft at 2.30 while 50 miles to the westward of Bovbjerg, and later at 3.05 came under fire from a detachment of light forces. Steering a zig zag course and at times seeking protection in the clouds to avoid the heavy defense fire, this airship laid several salvos of 50 kg. bombs of 3 to 5 each in the vicinity of a group of vessels which were in close formation and which were estimated to comprise one destroyer flotilla and six submarines. These craft could hardly be made out and were only located by the flash of gunfire. Evidently it was the intention of the enemy to force the airship off toward the Danish coast, since fire was renewed each time the ship left the protection of the cloud banks. Thereupon the airship cruised toward the Skagerrak and made what appeared to be an important discovery. At 4 a. m. it sighted from an altitude of 2,200 meters a detachment of 12 large ships and a number of cruisers in the Jammer Bight. Turning to course SW. in order to distinguish further details the airship could only make out that this force, which had been proceeding on line of bearing with an advanced screen of light cruisers, had now turned to the southward and was steaming at full speed. At the same time the *L–24* was fired on by two of the cruisers and forced off into the clouds to the NW. While a heavy mist lay over the water and made observations from above very difficult, the clouds overhead parted, so that on every attempt of the airship to approach this detachment it was taken under heavy fire. Even fishing vessels, which appeared to be lying harmlessly at their nets, hoisted the Danish flag on every appearance of the airship and joined in the fire. When a cloud bank finally closed down to 800 meters the contact with this enemy force had to be abandoned. Meanwhile the southerly winds had freshened considerably and forced the ship to return. At 11 a. m. the ship had reached a position over Tondern, but since weather conditions were unfavorable there it landed at 6 p. m. at Hage.

To what extent these observations of the *L–24* were in agreement with the actual facts of the case and exactly what class of ships were present at the time in the Jammer Bight has never been definitely ascertained. All that has been admitted from English sources is the statement that the detachment sighted might have been a convoy, but its strength, disposition of forces, and the purpose have not been stated. (Corbett: Naval Operations, Vol. III, page 416.)

When Admiral Scheer, however, received the report of the *L–24* stating that a number of enemy ships including 12 large units were sighted in the Jammer Bight, he thought he saw in this an answer to the puzzle as to the location of the British fleet after the conclusion of the daylight engagement. Thus, it did not now appear

remarkable that the German destroyer flotillas had found no opportunity to attack during the night and that to the general surprise the British fleet had not been sighted again by the Germans. Apparently, the British fleet, or at least a part of it, had, owing to their well-known apprehension of night torpedo attacks, retired to the northward after nightfall, to wait for daylight in an area to the eastward of Hanstholm.

But before the report of the *L–24* had been received by the commander in chief, Admiral Hipper had reported at 3.55 that the *Derfflinger* and *Von der Tann* had only two turrets ready for action, the *Moltke* had 1,000 tons of water in the hull of the ship and the *Seydlitz*, which had arrived at 3.40 off Horn Reef, was severely damaged. Therefore, Scouting Division I could not be considered for any further severe action and was dispatched to port by orders of the commander in chief, while he himself proposed to await further developments with the main body of the fleet off Horn Reef. For the immediate protection of the fleet against surprise attack, the *L–17* cruised at the time about 50 miles WSW. to WNW. of Horn Reef, while the *L–13* covered the area to the north and west of Terschelling and the *L–11* searched for enemy craft to the NW. of Helgoland. As the last-named airship passed over Helgoland it was not able to see the island on account of the low-lying mists, and encountered cloud banks at higher altitudes which restricted the range of visibility to about 2 to 4 miles. At 4 a. m., however, it sighted smoke clouds to the northward and continuing on in this direction was able to make out 12 large warships and numerous light forces, course NNE. at high speed about 90 miles NW. of Helgoland.

This force was the British battle cruiser fleet, although the number of large warships was considerably overestimated and probably included the armored cruisers of the First and Second Cruiser Squadrons. [Fig. 30. Note D. This was *L–11* instead of *L–17*.] Commander Schutze immediately reported this force by radio to the commander in chief and at an altitude of from 1,100 to 1,200 meters sought to maintain contact by tracking. He was soon taken under a heavy fire by this force and compelled to turn in circles toward the eastward. Thereupon, he encountered at 4.40 another detachment of six battleships accompanied by a number of light craft, about 18, NNE. of the first group. These vessels turned from north to the westward in the apparent effort to effect a concentration with the other force. What he had really sighted the last time were the rear ships of his own battle fleet. While he was maintaining contact with this second group, a third group came in sight about 20 miles to the northward of the group first sighted at about 4.50 a. m., which were estimated as three battle cruisers and four light craft. In reality,

these latter ships were the remainder of Admiral Burney's division, escorted by the *Faulknor*, *Obedient*, and the *Marvel*, which were still attempting to rejoin the British battle fleet. The latter turned behind the airship from the NE. and taking a position between this ship and the other detachment of the British fleet, opened a heavy fire on the airship, together with the other force so that the airship was under fire from 21 large ships and a number of smaller craft. Apparently the airship which was flying between 1,100 and 1,900 meters, was clearly visible in the sunlight, while the mists which covered the water prevented the airship from distinguishing more than one group at a time while the other could only be located by the flash of gunfire. Although the bombardment was fruitless, the explosion of heavy shell in the immediate vicinity of the airship decided the commanding officer to run before the wind to the NE. and at 5.30 all the detachments of surface craft were lost to view. Although at 5.35 the *L–11* again descended to an altitude of 500 meters, the mists near the water were so thick that no better view could be obtained and the ship then cruised out of sight of the enemy between them and its own fleet. This cruising in the vicinity of Horn Reef was continued until 7 a. m. when orders were issued by the commander in chief to discontinue air reconnaisance and the ship returned to the hangar under orders from the commander airship detachment recalling all airships.

The first report of the *L–11* regarding the "12 English battleships and numerous light forces" about 75 miles WSW. of the German fleet was received by Admiral Scheer at 4.30 a. m. Shortly, thereafter, the *L–24* reported a detachment of ships on course south at high speed from the Jammer Bight. The German commander was, however, so certain that the squadrons which he had engaged on the previous day had retired to the northward and that the force reported at 4.19 by the *L–24* were these identical ships, that he was not inclined to the belief that the squadron sighted by the *L–11* could be a part of the British fleet, as in reality they were. He was rather inclined to believe that this latter force might possibly be the Harwich Force, which standing out from port after the news of the battle, had been assigned the patrol of the western exits of the German Bight. In making this assumption he was not perplexed by the relatively large number of 12 battleships reported, since mistakes in types of ships were common in airship observations and on account of the poor visibility conditions which prevailed were rather to be expected. It is very questionable if the detachment reported by the *L–11* would accept battle before concentration with the forces to the northward. The great distance which separated these forces from the German fleet could not be looked on as a challenge to battle. No signs of the enemy forces were seen

from the latter at daybreak, but the weather was so misty that it was barely possible to see further than the length of one squadron. Of the light cruisers only the *Frankfurt*, *Pillau*, and *Regensburg* were available, while the air reconnaissance might fail at any time on account of the uncertain weather and decreasing visibility. Enticing as was the thought of approaching the force sighted by the *L–11*, it still appeared hopeless from the foregoing reasons to bring them to battle. The encounter with the enemy and the consequences would have been largely a matter of chance. For this Admiral Scheer was not ready to accept the responsibility without previous replenishment of fuel and ammunition and the repairs to his damaged ships. Aside from the fact that the flotillas had fired most of their torpedoes and were too restricted in their radius of action for employment in a second offensive, the leading ships of Battle Squadron III had lost considerably in fighting efficiency, while the older ships of Squadron II after the loss of the *Pommern* and the night action could not be exposed immediately to the requirements of a modern battle.

The commander in chief, therefore, decided very correctly to abandon further operations and at 4.45 ordered Squadron II to return to port. The remaining squadrons were, however, formed in column in battle line, Battle Squadron III and Scouting Division II having the highest fighting efficiency nearest the enemy. Squadron I and the Scouting Division IV to the southward of these, while the flotillas were disposed as an antisubmarine screen. The fleet was, therefore, in readiness to resume the engagement on the appearance of enemy forces near Horn Reef. Admiral Scheer was largely influenced in this decision to remain in the vicinity of Horn Reef by the fact that since 1.47 he had been without reports from the *Lutzow*. According to the last reports this ship should have been 70 miles NW. of Horn Reef on course south at 7 knots. Admiral Scheer was, however, not forced to wait much longer for an answer, for soon the *G–40* in reply to an inquiry stated that the *Lutzow* had been blown up and the crew taken off by the destroyers. Thereupon, the last reason for remaining in the vicinity, in which the ships had been repeatedly forced to sheer out to avoid suspected torpedo attacks, had vanished, since the maintenance of the field of battle in naval warefare is useless—in contradistinction to war on land—once the contact with enemy forces has ceased to exist. At 5.07 the commander in chief, therefore, gave the order "return to port by squadrons." One-half hour later he received the radio from the *L–11*, reporting the presence of three enemy battle cruisers 70 miles to the SW. of Horn Reef in the vicinity of the other forces and shortly thereafter the further report of six enemy battleships. But owing to the prevalent visibility conditions it was evident that the

airship might easily mistake the number of ships in the locality and from this message it was apparent that the enemy which were to the northward of Helgoland were stronger than originally assumed. From the same message it was learned also that these ships had turned to course west immediately upon sighting the airship. In this Admiral Scheer could find only a confirmation of his previous assumption that the enemy would not seek battle without first closing the forces reported to the northward. At 5.47 the *L–11* further reported that the forces he had sighted had turned to the northward and that contact had been lost, also that the position of the airship was uncertain. Thus the position of the enemy as reported by the airship must also be uncertain, and these forces could not then be located and brought to battle without adequate scouting and a large-scale operation. For these reasons the last reports of the airship could not influence the commander in chief to alter his decision. What Admiral Scheer had already attained was "glory enough to rank him with the greatest fleet commanders of all time" (Corbett: Naval Operations, Vol. III, p. 418).

The one hope which remained to the British fleet for counterbalancing the losses suffered in the day engagement did not rest in a renewal of the artillery duel, in which it had shown itself inferior on the previous day, but only in the employment of the underwater weapons of naval warfare.

On the previous evening at 11.15 p. m. the mine layer *Abdiel*, under Commander Curtis, on orders from Admiral Jellicoe, had left the battle fleet and advanced at 31 knots on course SSE. toward Horn Reef. This vessel was to lay a mine field 15 miles SW. by W. of Vyl Lightship, to the westward of a similar mine field laid on May 4 consisting of a hook-shaped barrier on the probable line of retreat of the German fleet. This was a further proof that Admiral Jellicoe had counted on Horn Reef as the objective of the German fleet during the night advance. Unseen by the German craft, this vessel had reached the initial point of the mine barrier by 2.24 a. m. and had completed its mission of laying the mines by 3 a. m. The mines were set at 4.5 meters under low-water level with a space of only 10 miles free between the two mine fields, so that there was reasonable certainty that the German fleet would strike one or the other mine field during the return to port. Unnoticed as on the approach to this locality the British minelayer completed the task assigned and retired at 30 knots to the northward. [Note A, fig. 30.]

Almost simultaneously with the arrival of the *Abdiel* the *E–55*, *E–26*, and *D–1* appeared off Horn Reef. These boats had left Harwich on May 30 and in accordance with the plan for British fleet operations which had been scheduled for May 28 took station to

the westward of Vyl Lightship with an interval of 8 miles between boats. [Note C, fig. 30, and Note I, fig. 2.] A further group consisting of the destroyer *Talisman* and the submarines *G–2*, *G–3*, *G–4*, and *G–5* had received orders to take station on the fourth meridian 80 miles to the NW. of Borkum Reef and had taken up these positions on May 31. [Notes J and K, fig. 2.] When the British operations planned for May 28 had been shattered by the German fleet advance, it still appeared that the submarines might take station to advantage in accordance with the original plan, as a more favorable position for attacking the German ships returning to port could hardly have been devised. In this, however, the British overlooked the fact that the original orders for these boats were for them not to show themselves until June 2, but to remain on the bottom, and since these boats had received no information regarding the change in plan, they acted accordingly. Thus the German fleet in returning to their bases steamed directly over this line of submarines without the latter making the slightest attempt to attack. The presence of enemy submarines in these waters was however strongly suspected and several ships thought they were being attacked between Vyl Lightship and Horn Reef—an uneasiness which can probably be attributed to the *V–4*, which was thought to have been sunk by a submarine. For a time the torpedo defence fire against suspected submarines was so energetic in Squadron II that the light cruisers which were drawn to the scene by the gunfire were themselves endangered and the commander in chief was forced to order the firing to cease.

This gunfire had scarcely been silenced when the fleet approached the mine field laid by the *Abdiel* on May 4. The mine-sweeper division which had steamed out to meet the fleet reported nothing suspicious. Individual drifting mines were so common in this area that these could not be regarded as a warning. The cruisers of Scouting Division IV and seven ships of Squadron I had already passed the barrier, while the *Derfflinger* and *Von der Tann* were steaming up on the port side of the column to join the *Moltke* at the head of the fleet when at 6.20 the *Ostfriesland*, directly ahead of the fleet flagship, ran onto a mine. The cable and part of the mine case fell on the ship's deck, so that the detonation could not have been the result of a submarine's torpedo as first suspected. The effect of this explosion was extremely small, thanks to the excellent underwater subdivision of the hull. Although the protective bunkers and double bottoms in four compartments to starboard were flooded, one man killed and eight slightly wounded, the torpedo bulkhead, although slightly leaking in one place, kept any dangerous amount of water out of the hull and the ship was soon able to make 15 knots and return to port under her own power. On orders from

the commander in chief the other ships following the *Ostfriesland* held their course and escaped any further damage since the enemy mines were spaced about 10 to the mile.

At 9.40 Commodore Heinrich turned about and advanced with the *Regensburg* and three boats of Flotilla IX toward Graa Dyb Lightship [position shown in fig. 30] in order to meet the *G–40* and other boats which were standing in with the crew of the *Lutzow* on board. At the same time the commander, First Half Flotilla, Lieutenant Commander Albrecht, stood out toward Lyngvig through Normands Channel with the *G–39*, *V–73*, and *V–88* in order to tow into port the *S–32*, which was anchored disabled. During the day it was possible to pick up these disabled boats and return to port.

Toward 7 a. m. the *Seydlitz* had been able to close the other ships of the battle fleet. But the approach to the coast was very difficult for this battle cruiser. As a result of the great mass of water which had penetrated the ship it was hard to estimate the speed of the ship through the water, while most of the charts had been lost in the battle or so badly smeared with the blood of the wounded that they were unreadable. The reserve charts, as well as the gyro compass, were located in a compartment which was flooded. Even the reserve gyro compass installation had suffered from the moisture. With the loss of practically all navigational facilities it is not extraordinary that the ship missed the lightship and ran aground at 3.40 a. m. to the eastward of North Ton Buoy of Horn Reef Shoals. Fortunately the ship was able to back off into deep water, and then, accompanied by six boats of Flotilla VII, to round the lightship and close the rear of the fleet at 6.40 a. m. Although up to that time the ship had been able to make moderate speed it was now forced to drop to 10 knots and later to 7 knots in order to ease the pressure on the severely strained bulkheads forward. But even though the ship was now drawing 13 meters forward, with the forecastle under water, it was able to navigate the Amrum Bank Channel, piloted by the *Pillau*, and escorted by five mine sweepers as a submarine screen. Toward 10 a. m. the ship grounded again opposite Hornum, and could only get clear by counter flooding in the after compartments. At 3.30 p. m. the situation had become critical. The only remaining buoyancy forward was the broadside torpedo room, while the list to port had considerably increased. The ship was steered by the stern, and an attempt on the part of the *Pillau* to assist with a tow was a failure, while the increasing seaway and the freshening breeze to force 8 greatly endangered the vessel. As a consequence the *Seydlitz* was only able to reach the Jade on June 2 with the assistance of two pumping vessels, while even then the most extraordinary efforts were necessary to stop the leaks and finaily

get the ship into the drydock. The fact that this ship was saved was due to the superb seamanship displayed by the commanding officer, Captain Von Egidy, the executive officer, Commander Von Alvensleben, and the battle-tried personnel under their command.

While the *Seydlitz* was still to the southward of Amrum Bank on June 1 the other ships of the fleet had reached the river mouths, protected from submarine attack by sea planes. Only on his return to port did Admiral Scheer receive reports which indicated the total extent of the enemy losses. Thus the *S–16*, Lieutenant Commander Loeffler, reported that he had two prisoners aboard who believed themselves to be the sole survivors of the battle cruiser *Indefatigable*. Another boat asked if it was known that the battle cruiser *Queen Mary* had been sunk, while the further reports of Admiral Hipper showed that still another battle cruiser must have been blown up. Further the loss of a number of enemy destroyers was fully determined, while the reports of losses sustained by the German fleet remained within moderate limits. At 10.16 the radio station at Neumunster reported that the enemy main body which was about 20 miles WSW. of Horn Reef Lightship had started to return to port, course north speed 20 knots. At 4 p. m. Admiral Scheer dispatched the following message to his forces: "In proud and thankful acknowledgment of the perfect leadership of the squadrons and the devotion to duty of the personnel I wish to express to the fleet my heartiest appreciation, while remembering with deepest regret those comrades who offered their blood and their lives for their country. Germany and our Kaiser 'uber alles'!"

Five ships of Squadron I immediately took over outpost duty near the Schillig Roads (*Posen*, *Nassau*, *Westfalen*, *Thuringen*, and *Helgoland*), while four ships ready for action anchored outside the locks of the Jade. The remaining ships proceeded directly to port to refuel and take ammunition. Of Squadron III, which bore the brunt of the battle with the battle cruisers, only the *König*, *Grosser Kurfürst*, and *Markgraf* required a more or less extensive overhaul period, while the other ships were able to effect repairs during the regular overhaul periods without restricting their fighting efficiency.

The report of the radio station at Neumunster regarding the retirement of the British main body was correct. At 5.30 a. m. Admiral Jellicoe had abandoned his battle formation to cruise to the northward in open formation well extended to search for disabled ships, friendly and enemy, in the vicinity of the night action and in particular to find the *Lutzow*. This change of formation had scarcely been effected when the light cruiser *Dublin*, which had lost contact with Commodore Goodenough's squadron during the night, and was steaming alone to the northward, reported an enemy armored

cruiser and two destroyers. The position given in the report was about 15 miles abeam of the *Iron Duke's* position at that time, but was rather uncertain as the navigator of the *Dublin* had been killed in the action with the German Scouting Division IV and the charts had been destroyed. Admiral Jellicoe was not influenced to change course by this report and held his own course to the northward, but Admiral Beatty, who had now come in sight of the fleet flagship, requested permission at 6.15 to scout to the eastward and southward in order to capture the enemy ships reported by the *Dublin*. In his opinion this vessel could only be the *Lutzow*. What the *Dublin* actually saw was the light cruiser *Rostock* with the destroyers *V–71* and *V–73*, which cruiser shortly after, while 50 miles NW. of Horn Reef, was abandoned by the crew and sunk. The sinking of this vessel was so expertly screened by an artificial smoke screen that the *Dublin* could not determine that it had been sunk and on an inquiry from Admiral Jellicoe replied that the enemy cruiser had apparently disappeared in the mists at high speed. The advance of the British battle cruisers to the southward and eastward was naturally without result. At 7 a. m. Admiral Jellicoe also turned with the battle fleet to a southeasterly course and thereupon received a report from the Admiralty stating that a disabled enemy cruiser which had been previously reported to him at 5.30 had been abandoned by the crew and was still afloat on the present course of the fleet. But this vessel was not sighted by any British ship.

Admiral Beatty wished to scout in the direction toward Horn Reef, but received orders to close the fleet and take station to the eastward of the battle fleet which at 8.16 had returned to course north. At that time the right wing column of the battle fleet, the Fifth Battle Squadron, was about 30 miles WNW. of Horn Reef Lightship. A quarter of an hour later Admiral Beatty turned on course NNE. to take station to the eastward of this squadron. But he apparently did not hold this course for a sufficient length of time, owing to a difference in dead reckoning positions, and, on turning to the northerly course at 9 a. m., he was in the wake of the fleet about 30 miles astern of the *Iron Duke*. The latter was now approaching the scene of the night action where the German fleet had broken through the rear screen of the British fleet. This was soon evident from the oil patches, wreckage, life preservers, and bodies which were seen floating in the area where severest night engagements had been fought. But here again was a further disillusionment, for, contrary to expectation, were found the evidences of the severe losses which had been sustained by the Fourth Destroyer Flotilla. In the immediate vicinity the *Sparrowhawk* was drifting disabled in the waves. About an hour after the sinking of the *Elbing* this destroyer had supposed itself attacked

by a German submarine and the last remaining gun had been manned for defence when it was found that the suspected submarine was in reality a raft containing the survivors of the *Tipperary*, who were only saved after the greatest exertions. Soon thereafter the destroyer *Marksman* and the cruiser *Dublin* came in sight. At 6 a. m. the former vessel, in company with the *Obdurate*, had managed to rescue the fully exhausted commanding officer and two men from the wreckage of the *Ardent*, while the *Maenad* picked up 10 men from the crew of the *Fortune*. The *Marksman* then tried to take the *Sparrowhawk* in tow but after vain attempts, lasting several hours, this expedient had to be abandoned on account of the increasing seaway and the boat was finally sunk by gunfire on orders from Admiral Burney, who was approaching with his division at that time. Shortly before this the commander in chief himself passed through a mass of wreckage, and after learning of the loss of the *Tipperary* from the *Marksman*, the destroyer *Oak* found a life buoy belonging to the *Ardent*. At another place a buoy of the *Black Prince* was found. The destroyer *Acasta* was taken to Aberdeen in tow of the *Nonsuch*, the *Porpoise* was escorted by the *Garland* to the Tyne, the *Spitfire* also laid course for the latter port, while the other destroyers rejoined the fleet formation with the exception of those which had to be detached for lack of fuel. After this short excursion to the SSW., at 10 a. m. the battle cruiser fleet had again resumed station and thus all detachments had then rejoined the fleet with the exception of the sixth division, which was unable to close before evening. It was now apparent that a further delay in that vicinity might bring new dangers to the fleet.

At 10.17 Admiral Jellicoe received a communication from the Admiralty stating that German submarines had received orders at 7.20 a. m. to advance to the northward of Horn Reef to search for the *Elbing*, and from 10 to 20 minutes after the receipt of this message the *Benbow* and *Colossus* suspected submarine tordedo attacks and thereby caused other ships to sheer out of formation. Admiral Jellicoe thereupon decided to abandon further search for disabled German vessels, since these might well have been sunk in the meantime. At 11 a. m., therefore, the fleet swung to course N. by W. while about 50 miles NW. of Horn Reef. In order to make certain, however, that no disabled or missing British ships were left behind he ordered the battle fleet and battle cruiser fleet to steam in open formation, well extended to cover the scene of action of May 31. They thereby ran the risk of striking the wrecks of the *Queen Mary*, *Indefatigable*, and *Invincible*. Therefore, Admiral Beatty deemed the moment propitious to inform the commander in chief of the exact latitude and longitude in which these ships had been

sunk. The radio message in which this information was given had quite an unexpected effect on the flagship. On inquiry from the commander in chief, Admiral Beatty stated that the *Queen Mary* and *Indefatigable* had been lost at 5.30 and 5 p. m. on the previous day, and the question showed that Admiral Jellicoe had been unaware of his loss up to that time. This communication had a very depressing effect on the flagship. The British commander was entirely unprepared for the news of such severe losses; who knows but what a timely knowledge of these losses might have prompted him to a more energetic offensive during the day engagement of May 31 and the morning of June 1 in order to make good the damage inflicted on his fleet? In any event it was a fateful neglect on the part of the commander of the battle cruiser fleet to inform his superior of the loss of these vessels only at this late date. Further apprehension was caused the latter by the uncertainty regarding the missing destroyers of the Fourth Flotilla and also the fact that he did not know whether the *Marlborough*, *Warspite*, and *Warrior* could be safely brought to port. Although the greatest eagerness prevailed in the Admiralty for news regarding the outcome of the battle, Admiral Jellicoe restricted his communications to the bald statement at 12.08 p. m. that the further search for disabled German cruisers in the prevailing weather with poor visibility had been without result, that he would continue the search for his own disabled ships, and that the Harwich Force, with the exception of a submarine screen for the *Marlborough*, was not needed.

At 12.25 Admiral Jellicoe came back again to the question of the loss of the *Queen Mary* and *Indefatigable* and inquired whether these ships had been sunk by mines, torpedoes, or gunfire and learned from Admiral Beatty that in all probability the loss was occasioned by enemy gunfire. He then inquired of the commander Second Cruiser Squadron regarding the *Duke of Edinburgh* and the *Black Prince* and was informed that the former ship was with the squadron while the latter was missing. Scarcely had Admiral Jellicoe received this last piece of ill news when a further message from the *Marlborough* to cap the climax stated that that ship was being attacked by enemy submarines. (12.44.)

While ill tidings were thus following one after another, in rapid succession, the British commander in chief sought in vain for definite news of the German losses. Toward 1 p. m. he was informed by the commander of the First Squadron, that at least one of the flotillas, the Twelfth, had made a successful attack during the night, although it was erroneously reported that a German battleship had been sunk in that engagement. Admiral Beatty

reported that, aside from the *Lutzow*, another German battle cruiser had probably been sunk, an assumption which, however, was later found to be unsupported. Further he had to report the loss on the English side of the destroyers *Nestor*, *Onslow*, [the *Onslow* regained port], *Nomad*, and *Turbulent*. The hopes still remained that the Fifth Battle Squadron would be able to report some success but this was not fulfilled. In reply to an inquiry, Admiral Evan Thomas reported that although a large number of hits had been observed, none of the German vessels had been forced to fall out of the formation, while, on the other hand, the *Warspite*, *Malaya*, and probably the *Barham* had sustained such severe damage that the whole Fifth Squadron with the exception of the *Valiant* would require docking. Soon thereafter (3.05) Admiral Jellicoe learned from a radio message sent by the *Engadine* that the armored cruiser *Warrior* had had to be abandoned 60 miles to the eastward of Aberdeen.

This cruiser had taken part in the engagement which had proven so fatal to the *Defense* and, receiving 15 major caliber hits and 6 smaller caliber hits, had only escaped complete destruction by the accidental blanketing of the *Warspite*. The aircraft tender *Engadine* had then taken the damaged cruiser in tow. The ship then had over 100 dead and wounded aboard. During the night the wind and sea had increased considerably, water filled both engine rooms in an alarming manner and at 8.45 a. m. the situation had become so critical that the ship had to be abandoned. They were, therefore, forced to be content with saving the crew, a dangerous and difficult task in the southwest storm, but the *Engadine* was able to take on board all the crew of the cruiser, including the wounded. The *Engadine* thereupon laid course for the Firth of Forth, while the seas were breaking over the wreck of the *Warrior*. When the Second Cruiser Squadron appeared on the scene where this cruiser was last reported, nothing was to be seen of the wreck.

From noon on Admiral Beatty searched the field of battle with his ships disposed on a 30-mile front between the wrecks of the *Queen Mary*, *Invincible*, and *Indefatigable*, while the battle fleet steamed on the western flank to the northward. But neither the *Nestor*, *Onslow*, *Nomad*, *Turbulent*, nor the flotilla leader *Broke* were sighted, and at 5.15 p. m. Admiral Beatty, while 50 miles SW. of Lindesnes, set course for the Firth of Forth, where the *Valiant* had already preceded the battle cruiser fleet under destroyer escort. At the same time the cruiser *Canterbury* was dispatched to Harwich. Several ships buried their dead at sea, and at 8.05 p. m. the battle fleet, with the *Barham* and *Malaya*, turned to course NW. to return to Scapa Flow.

While all the other ships of the Grand Fleet had been steaming away from the German bight since 4 p. m., the *Marlborough*, after Admiral Burney had transferred his flag, had also been on a northerly course, but at 5.30 had changed to S. 38 W. on orders from the commander in chief to pass to the southward of the Dogger Bank barrier en route to the Tyne or to Rosyth. Although the destroyer screen requested from Commodore Tyrwhitt could not possibly have reached this vessel at the time and her reduced speed made her an easy target for German submarines, she was left to proceed without adequate escort. Admiral Jellicoe was anxious to remove the remaining ships from the submarine danger zone as quickly as possible.

Although no German submarines had been with the fleet on the day of the battle, on May 31 the following submarines were in readiness for action in the Ems, *U–19*, *U–22*, *U–46*, and *U–64*, while the *U–53* lay in readiness at Helgoland. Originally they had been held in readiness to repel any attack of the English forces on the German coast in the absence of the fleet. Since, however, in the course of the afternoon (May 31) it developed that apparently the entire British fleet had participated in the action, it seemed better that these boats should be dispatched to the northward in order that they might be employed to advantage the next morning when the uncertainty of the situation had been cleared. Therefore, at 9.45 p. m. on May 31, Commander Bauer, leader of submarines, on his flagship *Hamburg*, with Scouting Division IV, had sent the following message through the *U–67*, cruising north of Terschelling, viz, "To Commander Third Half Flotilla (Commander Gayer): All available submarines proceed to northward, reporting positions at 6 a. m."

At the Ems, where the events transpiring at sea had been followed intensely in so far as this was possible from the radio communications intercepted, Commander Gayer had decided on his own initiative, to proceed with the three boats at the Borkum Roads to the meridian of Terschelling Bank Lightship to establish a line about 45 miles long to await opportunity to attack damaged British vessels en route to the English bases to the southward. The radio orders of the leader of submarines found these three boats already underway, and soon they were proceeding at full speed with the proper interval between units, past a point 40 miles to the northward of Terschelling on course north. On the other hand, the *U–53*, which had arrived at Helgoland from the Baltic only that morning, and the *U–67* [her position is shown in fig. 6], which had been lying on the bottom after sighting two enemy submarines in a fog near Terschelling, were in ignorance of these orders issued by their commander.

During the night the cruiser *Arcona*, which was designated to relay messages to the submarines, received a large number of mes-

sages regarding heavy fighting to the northward of Horn Reef. At 4.30 a. m. (June 1) the *U–46* reported at Borkum Roads from Emden after changing her periscope. The commanding officer was definitely informed of the situation and further that enemy forces were apparently attempting to reach the scene of action from the northward. At that time the other submarines, *U–19*, *U–22*, and *U–64* were from 45 to 70 miles to the northward of Terschelling according to their positions reported by radio. At 7.30 a. m. the *U–22* sighted a destroyer of the "M" class which however rapidly disappeared without being followed by other men of war.

Meanwhile the commander in chief had asked the leader of submarines if a submarine might be dispatched to the *Elbing*, which was supposed to be about 50 miles WNW. of Horn Reef. Since the radio transmitter of the *Hamburg* had been damaged in action, the leader of submarines requested that this order be transmitted through the *Arcona* to the commander Third Half Flotilla. This was received at 9 a. m. and transmitted directly to the *U–19*, while the *U–22* and *U–64* received the message later in the day; the *U–53* also left Helgoland to search for the *Elbing*.

Scarcely had this order been dispatched when the main decoding station at Neumunster reported that a disabled English ship was about 100 miles to the northward of Terschelling on course WSW. (10.15).

This was the *Marlborough*. As early as 5 o'clock this ship had sighted a Zeppelin and fired at it without result. Thus the position of the ship being known it could only expect further attacks from the German coast. At 10.30 two German submarines were sighted to the westward about 8 miles distant which appeared to be headed for the *Marlborough* with conning tower awash. (It is possible that one of these was the *U–64*, which boat, however, did not see the *Marlborough*.) When the boats submerged five minutes later, the *Marlborough* at 11.50, while 70 miles north of Terschelling, changed course to S. 56 W. At about this time Admiral Scheer ordered the Commander Third Submarine Half Flotilla to dispatch submarines to attack the British man-of-war reported by the station at Neumunster. The *U–46* was in the most favorable position for this attack. On the assumption that this boat would be about 20 miles to the southward of the English ship on the receipt of these orders and that the latter would be steaming at 7 knots the *U–46* would then have to proceed to the southwest shoal of the Dogger Bank in order to intercept the enemy ship at the exit to the eastward of Silver Pit. These instructions had not yet reached the submarine when at 11.30 a. m. while 65 miles to the northward of Terschelling two vessels were sighted one point off the starboard bow, which were made out as one destroyer with four stacks (light cruiser *Fearless*)

and one battleship of the *Iron Duke* class (*Marlborough*). The battleship had considerable list to starboard and was down by the head making about 10 to 12 knots on zigzag course in a general southwesterly direction. The four bow tubes were immediately made ready for action and at 12 noon the boat was about 3,000 meters distant bearing 70°. The *Marlborough*, however, had sighted the torpedo fired from an oil patch about 2 miles distant and turned off 6 points so that the torpedo passed about 50 meters to port. After this countermaneouver the commanding officer thought that further torpedo shots would be useless as well as a pursuit of the enemy vessel on the surface on account of the increasing sea from SW., although it was possible that the damaged battleship would thereby be further reduced in speed and the single destroyer as escort was insufficient protection against submarine attack. It is possible that the nervous tension due to the long wait off Terschelling may have had some influence on this decision. The *U–46* continued the advance to the northward and thus relinquished a brilliant opportunity to inflict further damage on the enemy after the battle. At 2.45 p. m. the *Marlborough* made contact with the much needed Harwich Force and thereupon received a screen of eight destroyers as a protection against submarine attacks.

One-half hour after the failure of the *U–46* attack, the *U–19* farther to the northward and about 20 miles eastward of the position reported by the Neumunster Station sighted a light cruiser and one destroyer (probably of the Fourth Flotilla), which the submarine was unable to approach. At 2 p. m. the *U–46* reported by radio the failure of the attack, and the *Arcona* was thereupon able to transmit to this boat the instructions regarding the pursuit toward the southwest shoal of the Dogger Bank. In the correct assumption that this message must apply to the ship attacked near noon the commanding officer turned to follow this vessel, but sought in vain for the damaged ship in the rain and decreasing visibility on course SSW., then SW. by S.

At the same time the third boat, *U–67*, with the commander Fourth Half Flotilla aboard, Lieutenant Commander Prause, also sought to make contact with the disabled ship reported by the Neumunster Station. Finally this boat reached the same conclusion as had the commander Third Half Flotilla, and laid course for Silver Pit, but made such low speed against the increasing wind and sea that no enemy ships were sighted.

Meanwhile the other submarines had advanced about 50 miles WNW. of Horn Reef, where a few hours before the entire British battle fleet had been cruising, and sought in vain for any trace of the *Elbing* or her crew. From 7.15 on the *U–22* passed oil streaks miles wide, and cruised through traces of wreckage, bodies, and

life buoys, finally fishing up one such buoy marked "Turbulent." An attempt to communicate with the *U–19* and *U–64* was without result. Meanwhile the commander Third Half Flotilla had received information of the greatest importance from the station at Neumunster. The latter reported that the enemy main body was in position 20 miles WSW. of Horn Reef at 10.47 a. m. The submarines then received orders as follows: *U–64* to proceed toward the Great Fisher Bank, *U–22* toward the Firth of Forth, and *U–19* toward Peterhead, in order to intercept the Grand Fleet in its expected turn to the westward. This occurred. By dawn, however, all their boats were forced to abandon further operations, as the bad weather which had set in made the use of any weapons impossible, and greatly decreased their speed. On the return toward Lister Deep the *U–64* was attacked at 8 a. m. June 2 by an enemy submarine 3 miles to the westward of Vyl Lightship. One of the torpedoes fired by the British boat passed close astern, the second 5 to 10 meters to one side, while the third exploded on the bottom after broaching near the bow. At noon June 3 the boats cruising to the NW. of Horn Reef were recalled.

Thus while all efforts to attack the retiring enemy fleet from this area had remained fruitless the hopes placed on the submarines in the immediate vicinity of the enemy bases were also doomed to be unfulfilled. Since the Germans had counted on the appearance of British forces from the southern ports during the progress of the fleet operations, Commander Bartenback, commanding the submarine flotillas in Flanders, had stood out from Zeebrugge on the night of May 30–31 with all available submarines. The primary mission of this flotilla was to lay mine fields near the exits from Harwich and the Thames, in the vicinity of Sunk Lightship, Inner Garbard and Galloper Lightships during the night of June 1. The following boats were assigned to this duty: *UC–10*, *UC–6*, and *UC–1*, under Lieutenants Nitzsche, Ehrentraut, and Ramien. At the same time the following boats were ordered to be on stations at 4 a. m., June 1, on a line 18 miles long near the coast in the vicinity of Lowestoft to attack warships standing to the northward, viz: *UB–17*, *UB–29*, *UB–19*, *UB–16*, *UB–12*, and *UB–6*. (Lieutenants Wenniger, Pustkuchen, Lieutenant Commander Becker, and Lieutenants Kiel, Salswedel, and Neumann.) At 8 a. m. the boats on the eastern flank of this line were to swing to the southward in order to form a second line with boats disposed at interval of 5 miles perpendicular to the first line for the purpose of intercepting enemy warships which were returning after the advance and were steering a more southerly course from the Thames. In the absence of developments up to 9 p. m. all boats were to advance to the eastward to form a third line 30 miles in length by 7 a. m., June 2, across the Hoofden between the

shoals of Smiths Knoll and the mouth of the Maas. From this line until 5 p. m. the boats were to cover the zone to the line of the fifty-second parallel of latitude between Orfordness and the Maas Lightship. In this manner it was hoped to cover the entire zone crossed by the enemy ships by boats cruising regularly throughout the area in question. In order to locate the enemy forces which might already be at sea and thus in a position to attack the German fleet on the flank during the proposed operations, the flotilla commander embarked on the *UB–18* to cruise together with the *UB–23* along the coast of Holland as far as Terschelling and finally to attach themselves to the southern flank of the third submarine scouting line.

Only one of the boats was unable to carry out this project, having suffered a machinery derangement in putting to sea. The *UC–6* ran afoul of a submarine net near Inner Gabbard, but was able to get clear and lay mines, together with the *UC–10* in the locality ordered at midnight May 31 and June 1. Of the other boats engaged in this undertaking only the *UB–10* sighted strong enemy forces.

These were eight enemy destroyers which passed the submarine on a southerly course about 9 a. m. June 1, 20 miles to the eastward of Southwold. All other boats encountered only individual destroyers aside from the usual patrols and seaplanes, and this was all that was seen of the Harwich Force during the offensive. An effort which was made to hold the boats on the third line for 24 hours longer as a result of the developments in the North Sea in the meantime was doomed to failure on account of the impossibility of establishing radio communication. As the boats took up position on the fourth line according to the plan and retired at 5 p. m. they were unaware of the events which had meanwhile transpired in the fleet engagement.

The most favorable opportunity for attack lay with the boats of the High Sea Fleet flotillas which had been waiting for a long time in the vicinity of the enemy bases to the northward. [For their positions see fig. 6.] Of these submarines only the *U–67*, *UB–22*, *U–70*, and *U–32* had received the code words announcing the commencement of the fleet operations, while all the other boats were totally unprepared. On the evening of the battle at 7 p. m. the *UB–21*, however, was able to fire a torpedo in shoal water at an enemy destroyer distant 1,200 to 1,400 meters in the vicinity of the Humber. The destroyer was hit and lay in a cloud of smoke, while the submarine withdrew before the pursuit of the patrol forces to deep water. Soon thereafter the submarine retired toward her base.

During the following night the *U–52*, which was cruising in the vicinity of the Firth of Forth between Longstone and St. Abbs Head, sighted at 3.18 June 1, two darkened warcraft, either light

cruisers or destroyers, which were about to enter the mine-strewn zone near the entrance to the Forth. Soon thereafter an incomplete radio message was intercepted reporting a battle in the North Sea. Since the radio reception with the net cutters as antenna supports was uncertain and the radio masts had been broken off, the submarine proceeded to the northward through the increasing wind and sea to seek junction with the *U–24* and *U–70*. At 6.20 the *U–24* was encountered, but as this boat had received no radio message the submarine returned to its assigned zone of operations.

Meanwhile the *U–32* which was also operating in the vicinity of the Firth of Forth had stood out as far as possible on account of the poor visibility conditions and the increasing bad weather. At 9.15 a. m. this boat had sighted a destroyer and in the hope of achieving at least some result on the last day of the undertaking, had fired a torpedo at her at about 1,200 to 1,500 meters. Owing to the poor weather conditions prevailing the torpedo missed.

There now appeared from the eastward the first of the returning warships which had participated in the battle. This was the badly damaged *Warspite* which at this time entered the zone of operations of the submarines near the Forth. At 10.35 a. m. this battleship was about 100 miles ENE. of May Island and was approaching the protection of the harbor without destroyer escort or protection when two torpedoes suddenly passed close by on each side of the ship. In the rough sea, however, no trace of the submarine could be seen. The attack had been made by the *U–51* under Lieutenant Commander Rumpel. Although the submarine had been able to hold her depth during the approach in spite of the heavy sea and spray, the periscope submerged just as the shot was about to be fired at a distance of 600 meters. Even though both bow tubes were fired only one torpedo left the tube which soon thereafter broke the surface and betrayed the attack, as the battleship immediately turned away to the northwestward and steering zigzag courses retreated at high speed. After a radio had been dispatched reporting this event, very heavy enemy radio traffic was noted, and as a result an energetic counter-offensive was to be expected. This the commanding officer did not believe the boat able to endure. Further, he was not fully aware of the nature of this encounter as he mistook the battleship for a vessel of the *Canopus* class and not the *Warspite* and also had not noticed that the vessel had been disabled in battle. He, therefore, abandoned pursuit of the vessel prematurely as he entirely misjudged the speed of which the battleship was capable, and submerging to a depth of 22 meters he retired toward his base during June 2.

The attack, however, had sufficed to alarm the entire coast patrol on the receipt of the message from the *Warspite* reporting the attack. The first destroyer of the patrol was just coming in sight at

12.42 when the *Warspite* sighted the periscope of another submarine which emerged close by the bow. The battleship thereupon signaled full speed in an attempt to ram the submarine but the transmission of the order through the steering engine room to the engine room (which was the only telegraph still in working order) took too long and the maneuver failed. The submarine sighted by the *Warspite* was the *U–63*. This submarine had been cruising on May 31 and June 1 between May Island, North Carr Lightship, and Bell Rock, keeping a vain lookout for enemy warships, and after one engine had broken down was about to return to port, when at 12.30 p. m., while about 40 miles eastward of the Firth of Forth, two or three enemy ships were sighted to the SE., which were steaming at high speed on a northerly course. In the heavy spray the submarine lost the leading ship from view in the periscope, but on looking around again the *U–63* sighted a cruiser on the starboard beam. (In reality this was a destroyer which had just joined forces with the *Warspite*.) Although the vessel had already passed the submarine turned to attack. At this time a loud propeller noise was heard, and turning the periscope the commanding officer suddenly sighted on the quarter a large cruiser with three stacks (apparently the *Warspite*) which was about to ram him while at the same time a shot was fired from one of the guns on the upper bridge. The distance was between 50 to 100 meters at that time. Submerging rapidly the submarine brought up on the bottom at 50 meters and immediately rose to a depth of about 7 meters, was taken under fire but was able to escape by submerging to 27 and then to 35 meters, although pursued and bombed repeatedly by the escorting patrol forces. The submarine thereupon continued on to port.

Meanwhile the *U–52* had returned to its assigned zone of operations near the coast in the vicinity of Berwick. There it was forced to submerge twice during the afternoon to avoid enemy destroyers but at 5.28 p. m. it fired a torpedo at the last boat of a group at a distance of about 600 meters. When the submarine submerged after the attack to 30 meters a severe explosion was heard. The torpedo had made a hit; but at the same moment the rudder jammed. The *U–52* was, therefore, unable to come to periscope depth to observe the result of the shot but was forced to continue steaming in a circle under water at 40 meters. After a quarter of an hour's work it was possible to free the rudder from the obstruction but the steering gear was still out of commission and the commanding officer was forced to return to port past Horn Reef, using the propellers to steer.

In the meantime the leader of submarines, Commander Bauer, had made every possible effort to keep the submarines stationed on the coast of England and Scotland at their stations one day

longer, instead of permitting them to return according to the plan on June 1, since in his opinion, the damaged ships returning from the battle would hardly be able to reach port before June 2. It was further to be assumed that some of these vessels would return to the Tyne instead of going to the Firth of Forth in order to relieve the congestion of the docks at Rosyth. While the German fleet was still at sea returning to port at 9 a. m. June 1 he therefore had the following message repeated twice from the radio stations at Nauen and Brugge: "Since damaged ships returning from Skagerrak are to be expected, the period of waiting off east coast is to be prolonged one day if possible. *U–32* and *U–24* to take station off the Tyne for the same period." This order was at first received only by the *U–24* which immediately proceeded to the Tyne [fig. 6]. At 5 p. m. the *U–32*, after repairing the radio antenna which had been damaged by the high seas, was able to get this message and thereupon laid course for the Tyne.

The neighboring boat, *U–70*, had noticed an appreciable increase in the activities of the patrol forces since June 1 and had been forced to submerge so frequently while about 60 miles outside of May Island that the boat was unable to pick up radio messages. Without knowledge of the order extending the period of waiting by one day this boat started to return to port on the same day. Thus most of the German submarines had already left the assigned zones of operation near the Firth of Forth when the British battle cruiser fleet approached from the NE. on the morning of June 2. In particular the most important sector which had been occupied by the *U–32* was now free of submarines, as this boat had proceeded to the Tyne according to instructions received. Thus, the entrance of the battle cruisers into port was accomplished without loss. At the same time the battle fleet was approaching the Pentland Forth, which area had been occupied only by two German submarines from the start. Of these the *U–43* had sighted two patrol vessels on June 1 and a torpedo fired at one of them at 300 meters had gone under the target. This boat then left the assigned sector pursued by the patrol vessels only a few hours before the approach of the battle fleet. This boat had received no information concerning the events which had meanwhile transpired in the North Sea, nor had it received the order to remain on station for one day longer. On the other hand, the other boat assigned to the sector near Pentland Forth, *U–44*, had received the orders to wait on station from the radio sent out from Brugge during the evening of June 1. Soon thereafter the lively enemy radio traffic between the British cruisers and destroyers indicated that enemy warships would also be approaching Scapa Flow. Since it was to be assumed that these

craft would attempt to pass the submarine danger zone during the hours after nightfall, the *U–44* steered in the middle of the assigned sector well out to sea in order to intercept these ships in daylight. Owing to the very poor visibility, however, the submarine was soon forced to submerge to 20 meters. Although the commanding officer had decided to remain on station during June 2, it was found at daybreak that the seas were so heavy the boat could not be maintained at the attacking depth, and further, the increasingly bad weather prevented the boat from making an approach on four auxiliary vessels which were sighted to the NW. soon after coming to the surface. The NW. wind having increased to 9 and 10 in strength, the boat started to return to port, choosing at first a southerly course to reach the line between Firth of Forth and Skagen before steering to the eastward. Therefore, the British battle fleet passed to the northward of the zone of operations of the *U–44* and *U–43* without encountering a submarine offensive on return to its base.

At about the same time the *Marlborough* was approaching the coast near the Tyne from the southwest shoal of the Dogger Bank. On the evening before the wind from WSW. had gradually freshened to force 6 and the increasing sea had increased the difficulties for this badly damaged ship. When some of the bilge pumps became choked the water rose again in the forward firerooms. The situation thereupon became critical and as the ship could not make more than 10 knots, the attempt to reach the Tyne was abandoned and the vessel headed for the protection of the high cliffs near Flamborough Head in order to proceed from there along the coast to the Humber.

Although the *UB–21* and *UB–22* had already left station in this vicinity on the evening of June 1 after a long period of waiting, the *U–46*, on the other hand, was then approaching Flamborough Head. After the failure of the attack of this boat on the *Marlborough* on the previous afternoon it had received orders to follow the battleship to that point. As a result of the bad weather the advance of the submarine had been so slow that at 10.25 a. m. June 2 it was still about 25 miles ENE. of its destination, while the *Marlborough* had already passed the entrance to the Humber about 2 hours earlier. Thus, instead of sighting the battleship, the submarine sighted only five light cruisers and nine destroyers (probably the Harwich Force) on a westerly course, which passed the bow of the submarine distant about 10,000 meters making a shot impossible. At 5.30 p. m. the *U–46* put about close ashore and laid course for the Ems.

Meanwhile the *U–24* and *U–32* cruised in the vicinity of the Tyne without sighting any warships other than a few destroyers. After

receiving a radio from Brugge at 4.26 p. m. June 2 stating that no further damaged vessels were to be expected in that vicinity the two submarines started to return to port at 9 p. m. on that date.

The *U–66* and *U–70* had also made great efforts on June 2 to locate and attack the damaged enemy ships which were en route to their home bases after the battle. Although the *U–66* had already left its self-chosen station near Cromarty Forth at 10 p. m. June 1, in order to reach Horn Reef before dark the next day, it was able to pick up the message from the fleet and repeated from Brugge at 3 a. m. the same night stating that damaged enemy ships were to be expected near the Firth of Forth and the Humber. Further, the boat was able to intercept a message from the station in Flanders ordering the flotilla to remain on station 24 hours longer to intercept returning English forces. From the messages the commanding officer was able to conclude that a large-scale fleet offensive had been in progress in the southern part of the North Sea. He was about to proceed to this locality when he received a message from the *Arcona* stating that damaged English vessels were to be expected approaching from the Skagerrak. He thereupon decided to intercept these vessels on the line between the Firth of Forth and Skagerrak. This decision was reported to the leader of submarines by radio but did not meet with the approval of the latter. According to the radio messages which had been intercepted and further transmitted to the submarines, a number of enemy ships which had been disabled in battle were steering courses for the Humber and Rosyth. If the speed of some of these vessels were assumed to be as low as four knots and taking into account the further delay due to bad weather conditions, it was possible that even as late as the evening of June 3 and the next day there might still be favorable opportunities for attack in the vicinity of the Firth of Forth. The *U–66*, therefore, received orders to patrol that area until the evening of June 4 if possible. This order was not carried out, however, since it developed from further radio messages that the commander in chief did not count on the submarines being able to encounter any further damaged enemy ships from that time on. The commanding officer of the *U–66* thereupon broke off the undertaking. The *U–70* was also en route to port when at 7.30 a. m. June 2 that boat received the radio ordering the submarines to remain 24 hours longer on station if possible. But in a manner similar to the commander of the *U–66*, this officer did not deem it proper to carry out these instructions as he would be unable to reach his assigned sector in sufficient time against the heavy seas, while further the low visibility conditions and the counter-offensive measures near the coast gave no promise of achieving any success. He felt that greater results were probable if he stood further out sea on

the probable line of approach of these disabled enemy ships. In the course of the afternoon the storm died out. Since however nothing was sighted up to 11 p. m., the *U–70* returned to port.

The *U–47*, although without information regarding the events which had transpired in the meantime, held out the longest on its assigned station near Peterhead. There it sighted a destroyer in the high wind from the NW., force 9, on June 2, but was forced to abandon the attack as a shallow torpedo shot in the high seas would have no chance of success. At 10 p. m. this boat also left its assigned station in accordance with orders received before proceeding on its mission and started to return to port, arriving off the Ems on June 4. The majority of the submarines had reached their home bases on the preceding day. On the latter part of the trip to port most of these boats had encountered only enemy destroyers and submarines.

At the scene of the battle the *U–75* was the only submarine which was present at the same time with the Grand Fleet on June 1. This boat had reached the vicinity of the Norwegian coast near Utsire at about 8 p. m., May 31, on its return from the assigned mine-laying operations near the Orkney Islands. On June 1 the boat reached a position about 90 miles to the westward of Hanstholm, without being aware of the events which had occurred in the meantime, and came upon a large field of wreckage filled with drifting spars, life buoys, matting, and oars, while dead fish and sea gulls were thick on the surface of the water. At 3 p. m. the submarine sighted the wreck of the *Invincible* in 57° 3′ N. and 6° 0′ E., while a British destroyer cruised in the vicinity, but strange to say, the British battle cruiser fleet, which was in the vicinity at the time, was not sighted. From this time on the wind and sea increased, and by the following morning the storm was raging at full strength. In the bright sunshine the heavy seas were breaking completely over this submarine, which proved to be an excellent sea boat. Considerable water was shipped through the conning tower, while the commanding officer and watch officers were forced to wear life belts. The air intake for the Diesel engines had to be closed and the air for these motors drawn through the conning tower. This opening suddenly closed, while the engines continued to run, and the personnel below were in danger of being entirely deprived of air. Finally the chief engineer was able to open the air intake after efforts on the part of the captain to open the conning tower escape had failed, and the crew were saved from a serious situation. After the *U–75* had avoided three enemy submarines, which were in the vicinity of Horn Reef, the boat received the first news of the battle from one of the patrol vessels and stood in to Helgoland on June 3.

[The above detailed descriptions demonstrate most forcibly the limitations of submarine operations against combatant ships.]

Three days later the mine field which was laid by the *U–75* on May 29 to the westward of the Orkneys in the regular warship channel was to become effective. [Note Z, fig. 6.] On June 5, Lord Kitchener with a staff of six officers arrived at Scapa to embark on the cruiser *Hampshire* for passage to Archangel. The mission of Lord Kitchener was the strengthening of the Russian resistance and admitted of no delay. On the eve of the field marshal's arrival a severe storm came up and prevented the usual sweeping operations in the channel which the *Hampshire* was to pass to the eastward of the Orkneys. It was, therefore, decided to route the *Hampshire* to the westward of the Orkney Islands close in to the coast where the vessel might have the protection of a destroyer escort, as the seas there were not so heavy. It appeared practically impossible that this route could have been strewn with mines by an enemy surface craft. The German submarine mine layers had heretofore restricted their activities to the area to the southward of the Firth of Forth, and it was, therefore, assumed that the radius of action of these vessels was too limited to permit more extensive operations and therefore no danger from this source was to be expected. The severe weather which prevailed at the time was the best possible protection against attacks from other submarines and this was also the reason why the passage on both sides of the Orkney Islands had not been swept for mines for the past four or five days.

In reaching this conclusion, however, it was overlooked that the fishing boat *Laurel Crown* had run on to a mine field and been sunk in this very zone on June 2. Thus the British commander in chief must have been aware of the existence of this mine field. The fact that in spite of this the dangerous route to the westward of the Orkneys was selected for the *Hampshire* can only be explained on the ground that the entire communication service was so overloaded with the reports covering the recent battle that the sinking of a small fishing vessel was not brought to the personal attention of the British commanders. The armored cruiser stood out to sea at 6.30 a. m., June 6, with Lord Kitchener on board and escorted by two destroyers. Conditions were made even worse by the fact that the wind hauled around to the NW. at 8 a. m., making it necessary to send the destroyers back to port as they could not maintain the speed of the cruiser against the heavy seas. A half an hour later the *Hampshire* struck a mine about 1.5 miles from shore between Brough of Birsay and Marwick Head and, as observed from ashore, sank in 15 minutes. In the heavy seas no boat could

be lowered by the damaged cruiser, the ship capsized, and only 12 men were saved by drifting ashore on a raft. The others, including Lord Kitchener and his staff, were drowned before assistance in the form of destroyers and patrol vessels could reach the spot. In the loss of Lord Kitchener England mourned the passing of a man who was a pillar of the strength and greatness of the Empire, and an emblem of the national unity, as testified by the obituary notices.

Appendix 5

ORGANIZATION OF THE GRAND FLEET ON MAY 30, 1916

Battle Fleet

Fleet flagship, Iron Duke

SECOND BATTLE SQUADRON

First division	*Second division*
King George V (flag).	Orion (flag).
Ajax.	Monarch.
Centurian.	Conqueror.
Erin.	Thunderer.

FOURTH BATTLE SQUADRON

Third division	*Fourth division*
Iron Duke (flag).	Benbow (flag).
Royal Oak.	Bellerophon.
Superb.	Temeraire.
Canada.	Vanguard.

FIRST BATTLE SQUADRON

Fifth division	*Sixth division*
Colossus (flag).	Marlborough (flag).
Collingwood.	Revenge.
Neptune.	Hercules.
St. Vincent.	Agincourt.

ATTACHED LIGHT CRUISERS AND DESTROYERS

Boadicea.	Active.
Blanche.	Oak.
Bellona.	Abdiel.

THIRD BATTLE CRUISER SQUADRON

Invincible (flag).
Inflexible.
Indominatable.
Canterbury (attached light cruiser).
Chester (attached light cruiser).

FIRST CRUISER SQUADRON

Defense (flag).
Warrior.
Duke of Edinburgh.
Black Prince.

SECOND CRUISER SQUADRON

Minotaur (flag).
Hampshire.
Cochrane.
Shannon.

FOURTH LIGHT CRUISER SQUADRON

Calliope (flag).
Constance.
Caroline.
Royalist.
Comus.

DESTROYER FLOTILLAS

Twelfth flotilla	*Eleventh flotilla*	*Fourth flotilla*
Faulknor (flag).	Castor (flag).	Tipperary (flag).
Marksman.	Kempenfelt.	Brokeachates.
Obedient.	Ossory.	Porpoise.
Maenad.	Mystic.	Spitfire.
Opal.	Moon.	Unity.
Mary Rose.	Morning Star.	Garland.
Marvel.	Magic.	Ambuscade.
Menace.	Mousey.	Ardent.
Nessus.	Mandate.	Fortune.
Narwhal.	Marne.	Sparrowhawk.
Mindful.	Minion.	Contest.
Onslaught.	Manners.	Shark.
Munster.	Michael.	Acasta.
Nonsuch.	Mons.	Ophelia.
Noble.	Martial.	Christopher.
Mischief.	Milbrook.	Owl.
		Hardy.
		Midge.

BATTLE CRUISER FLEET

Flagship, Lion.

FIRST BATTLE CRUISER SQUADRON

Princess Royal (flag).
Queen Mary.
Tiger.

SECOND BATTLE CRUISER SQUADRON

New Zealand (flag).
Indefatigable.

FIFTH BATTLE SQUADRON

Barham (flag).
Valiant.
Warspite.
Malaya.

80498—26——16

FIRST LIGHT CRUISER SQUADRON

Galatea (flag).
Phaeton.
Inconstant.
Cordelia.

SECOND LIGHT CRUISER SQUADRON

Southampton (flag).
Birmingham.
Nottingham.
Dublin.

THIRD LIGHT CRUISER SQUADRON

Falmouth (flag).
Yarmouth.
Birkenhead.
Gloucester.

DESTROYER FLOTILLAS

First Flotilla	*Thirteenth Flotilla*	*Ninth and Tenth Flotillas*
Fearless (flag).	Champion (flag).	Lydiard (flag).
Acheron.	Nestor.	Liberty.
Ariel.	Nomad.	Landrail.
Attack.	Narborough.	Laurel.
Hydra.	Obdurate.	Moorsom.
Badger.	Petard.	Morris.
Goshawk.	Pelican.	Turbulent.
Defender.	Nerissa.	Termagant.
Lizard.	Onslow.	
Lapwing.	Moresby.	
	Nicator.	

AIRCRAFT TENDER

Engadine

Appendix 7

ORGANIZATION OF THE HIGH SEAS FLEETS ON MAY 31, 1916

The Main Body

Fleet flagship, Friedrich der Grosse

BATTLE SQUADRON III

Fifth division	*Sixth division*
König (flag).	Kaiser (flag).
Grosser Kurfurst.	Prinzregent Luitpold.
Markgraf.	Kaiserin.
Kronprinz.	

BATTLE SQUADRON I

First division	*Second division*
Ostfriesland (flag).	Posen (flag).
Thuringen.	Rheinland.
Helgoland.	Nassau.
Oldenburg.	Westfalen.

BATTLE SQUADRON II

Third division	*Fourth division*
Deutschland (flag).	Hannover.
Pommern.	Schleswig-Holstein.
Schlesien.	Hessen.

SCOUTING DIVISION IV

Stettin (flag).	Frauenlob.
Munchen.	Stuttgart.

Hamburg (flag of the leader of submarines)

DESTROYER FLOTILLAS

Rostock (flag of the first leader of destroyers)

Destroyer Flotilla I

G–39 (leader)

First Half Flotilla	*Second Half Flotilla*
G–39 (leader).	———
G–40.	———
G–38.	———
G–32.	———

DESTROYER FLOTILLAS—continued

Destroyer Flotilla III

S–53 (leader)

Fifth Half Flotilla	*Sixth Half Flotilla*
V–71 (leader).	S–54 (leader).
V–73.	V–48.
G–88.	G–42.

Destroyer Flotilla V

G–11 (leader)

Ninth Half Flotilla	*Tenth Half Flotilla*
V–2 (leader).	G–8 (leader).
V–4.	G–7.
V–6.	V–5.
V–1.	G–9.
V–3.	G–10.

Destroyer Flotilla VII

S–24 (leader)

Thirteenth Half Flotilla	*Fourteenth Half Flotilla*
S–15 (leader).	S–19 (leader).
S–17.	S–23.
S–20.	V–89.
S–16.	———
S–18.	———

THE SCOUTING FORCES

SCOUTING DIVISION I

Lutzow (flag)

Derfflinger.	Moltke.
Seydlitz.	Von der Tann.

SCOUTING DIVISION II

Frankfurt (flag).	Elbing.
Pillau.	Wiesbaden.

DESTROYER FLOTILLAS

Regensburg (flag of second leader of destroyers)

Destroyer Flotilla II

B–98 (leader)

Third Half Flotilla	*Fourth Half Flotilla*
G–101 (leader).	B–109 (leader).
G–102.	B–110.
B–112.	B–111.
B–97.	G–103.
	G–104.

DESTROYER FLOTILLAS—continued

Destroyer Flotilla VI

G–41 (leader)

Eleventh Half Flotilla	*Twelfth Half Flotilla*
V–44 (leader).	V–68 (leader).
G–87.	V–45.
G–86.	V–46.
	S–50.
	G–37.

Destroyer Flotilla IX

V–28 (leader)

Seventeenth Half Flotilla	*Eighteenth Half Flotilla*
V–27 (leader).	V–30 (leader).
V–26.	S–34.
S–36.	S–33.
S–51.	V–29.
S–52.	S–35.

SUBMARINES OF THE HIGH SEAS FLEET

Hamburg (flag of leader of submarines)

First Submarine Half Flotilla

V–159, UB–20, U–77, UB–28, U–74, U–71, U–72, UB–21, UB–22, UB–27, U–25

Second Submarine Half Flotilla

T–99, U–51, U–52, U–53

Third Submarine Half Flotilla

G–137, T–71, U–20, U–47, U–22, U–19, U–24, U–43, U–44, U–45, U–46, U–48

Fourth Submarine Half Flotilla

T–101, T–36, U–28, U–64, U–32, U–67, U–63, U–66, U–70, U–69

NAVAL AIRSHIP DETACHMENT

L–9, L–11, L–13, L–14, L–16, L–17, L–21, L–22, L–23, L–30

Appendix 9

Expenditure of ammunition by the German ships during the Battle off the Skagerrak

Ship	30.5 cm.	28 cm.	17 cm.	15 cm.	10.5 cm.; 8.8 cm.	Torpedoes	Remarks
Lutzow	380			400		2	Approximate.
Derfflinger	385			235		1	
Seydlitz		376		450			
Moltke		359		246		1	
Von der Tann		170		98			
König	167			137			
Grosser Kurfurst	135			216			
Markgraf	254			214			
Kronprinz	144						
Kaiser	224			41			
Prinzregent	169			106			
Kaiserin	160			135			
Friedrich der Grosse	72			151			
Ostfriesland	111			101			
Thuringen	107			115			
Helgoland	63			61			
Oldenburg	53			88			
Posen		53		64			
Rheinland		35		26			
Nassau		106		74			
Westfalen		51		176	106		
Deutschland		1			5		
Schlesien		9	30		6		
Hessen		5	34		24		
Schleswig-Holstein			20				
Hannover		8	21		44		
Elbing				230		1	
Pillau				113	4	1	
Frankfurt				379	2	2	
Rostock					500		
Regensburg					372		
Stettin					81		
Munchen					159		
Stuttgart					64		
Hamburg					92		
Flotilla I					784	8	
Flotilla II					648	1	
Flotilla III					267	22	
Ninth Half Flotilla					239	1	
Flotilla VI					222	29	
Flotilla VII						5	
Flotilla IX					[1] 1,587	31	
Total	2,424	1,173	95	3,857	5,300	109	

[1] Includes total ammunition supply of boats which were sunk.

Total fired:	Shell
Main battery	3,597
Intermediate	3,952
Secondary	5,300

The main battery made 120 hits, equal to 3.33 per cent.

The intermediate and secondary batteries made 107 hits.

NOTE.—According to the British reports of ammunition expenditure and the hits made the following is the result:

Total fired by British ships, 4,598 main battery shells, which included 1,239 38.1-cm shells.

These made 100 hits, equal to 2.17 per cent.

Appendix 11

Hits received by German ships

Ships	Heavy projectiles	Medium and light projectiles	Date when repairs were completed	Remarks
Battleships:				
König	10		July 21	
Grosser Kurfurst	8		July 16	
Markgraf	5		July 20	
Kaiser	2			
Ostfriesland			July 26	Mine hit.
Helgoland	1		June 16	
Oldenburg		1		
Nassau		2	July 10	
Rheinland		1	June 10	
Westfalen		1	June 17	
Schleswig-Holstein	1		June 24	
Pommern	1		(1)	Torpedo hit.
Battle cruisers:				
Lutzow	24		(1)	
Derfflinger	17	9	Oct. 15	
Seydlitz	21	2	Sept. 16	Do.
Moltke	4		July 30	
Von der Tann	4		Aug. 2	
Light cruisers:				
Frankfurt		3	July 8	
Elbing		1	(1)	
Pillau	1		July 17	
Wiesbaden			(1)	
Rostock			(1)	Do.
Stettin		2	July 20	
Munchen		5	June 29	
Frauenlob			(1)	Do.
Hamburg		4	June 15	
Destroyers:				
S–50		1		
B–98		1	June 20	
G–40		1	June 15	
S–32		3	July 31	
S–51		1	June 19	
V–27		2	(1)	
V–29	1		(1)	Do.
S–35			(1)	
G–41		1		
V–28		1	June 13	
V–48			(1)	
Total	100	42		

[1] Sunk.

[The heavy hit against V–29 must be meant for S–35.]

Appendix 12

German guns put out of action

Ship	Main battery	Secondary battery
Derfflinger	4	[illegible]
Seydlitz	4	[illegible]
Moltke		2
Von der Tann	2	
König		2
Grosser Kurfurst		[illegible]
Markgraf		[illegible]
Schleswig-Holstein		1
Total	10	11

Appendix 14

German personnel losses in the Battle off the Skagerrak

Types of ships and names	Killed or drowned	Wounded	Total	Strength of crew on May 31	Percentage of losses
Battleships:					
Ostfriesland	1	10	11	1,390	0.79
Oldenburg	8	14	22	1,284	1.71
Rheinland	10	20	30	1,128	2.66
Nassau	11	16	27	1,139	2.37
Westfalen	2	8	10	1,124	.89
Pommern	844		844	(1)	
Schlesien	1		1	828	.24
Schleswig-Holstein	3	9	12	865	1.39
König	45	27	72	1,315	5.47
Grosser Kurfurst	15	10	25	1,284	1.95
Markgraf	11	13	24	1,286	1.87
Kaiser		1	1	1,249	.08
Prinzregent Luitpold		11	11	1,278	.86
Battle cruisers:					
Lutzow	115	50	165	(1)	
Derfflinger	157	26	183	1,391	13.16
Seydlitz	98	55	153	1,425	10.74
Moltke	17	23	40	1,355	2.95
Von der Tann	11	35	46	1,174	3.92
Light cruisers:					
Pillau	4	19	23	492	4.67
Elbing	4	12	16	(1)	
Frankfurt	3	18	21	562	3.74
Wiesbaden	589		589	(1)	
Rostock	14	6	20	(1)	
Stettin	8	28	36	400	9.00
Munchen	8	20	28	365	7.67
Fraunenlob	320	1	321	(1)	
Hamburg	14	25	39	326	11.96
Destroyers:					
G-40	1	2	3		
S-32	3	1	4		
B-98	2	11	13		
V-48	90		90	(1)	
V-4	18	4	22	(1)	
G-87	1	5	6		
G-86	1	7	8		
G-41		5	5		
Total	2,429	492	2,921		

[1] Sunk.

Der krieg zur see, 1914-18.
v.5, p.481-482

Appendix 17

Summary of the most important radio messages and signals during the Battle off the Skagerrak

[All times given are summer central European times. In dates, V means May and VI June. Thus 31 V is 31 May. Signals of special interest are marked *]

From—	To—	Time group	Time received	Contents
May 30				
Brügge	All submarines			Prepare for enemy forces standing out 31 V and 1 VI.
Commander in chief.	Fleet	1048		Complete concentration in outer roads before 8 p. m. at latest.
Commander scouting forces.	Patrol boats	1137		30 V and 31 V search for submarines.
Do	Airplanes	do		31 V search for submarines west of Helgoland, Amrum Bank, and List.
Do	Mine Sweeper Division I.	1231		Sweep passage west of Helgoland and Amrum Bank 30 V. On 31 V search for submarines in that area at dawn.
Commander in chief.	Fleet	1640		"31 Gg. 2,490."
Do	do	1841		Van of Squadron III will pass war lightship A of the Jade at 4.30 a. m. Squadron II commence taking part in the operation following Squadron I. Radio guard in German Bight at entrance III.
Helgoland Air Station.	Commander in chief.	1650	4.59 p. m.	Air reconnaissance impossible for present, account weather conditions.
*Arcona	Ostfriesland	2002		Leader of submarines, High Seas Fleet: U-46 in 15ay near Terschelling lightship has sighted enemy submarines 6 times. Fired on once with torpedo and once with gunfire. Impossible to cruise on surface in this zone by daylight. Many floating mines in this area. U-46 ready for service in Southern North Sea after renewal of periscope. U-22 ready for service. Signed, Third Submarine Half Flotilla.
Nordholz	do	2105	9.12 p. m.	To commander in chief: Propose air reconnaissance to-morrow morning. Signed, Naval Airship Detachment.
Arcona	do	2120	9.48 p. m.	For leader of submarines: cruising between Terschelling Bank Lightship and 121y. Signed, U-67.
*Schillig	Commander in chief.		10.20 p. m.	For commander in chief and commander scouting forces: 1. Steamer report: May 27 about 6 hours after passing Spurn Point Lightship (on course Hull-Rotterdam) one squadron 8 large battleships, 12 destroyers course SW.; sighted in distance. 2. Report of a pilot returned from Helder: Had heard from an English captain that numerous cruisers and destroyers were between Hull and Ijmuiden. No date. Signed, Naval Staff.
Do	do		10.45 p. m.	Weather prediction for tomorrow changed. Northerly winds along coast low down, hauling around to east in morning. Up to 1,000 meters strength seldom over 5. Cloudy. Good visibility. NW. North Sea probably fresh SW. breezes. Prediction uncertain. Signed, Naval Air Weather Service.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31				
*Nordholz	Entrance III	0135	1.40 a. m.	To commander in chief: Airship reconnaisance impossible for present owing to weather. Signed Naval Airship Detachment.
Schillig	Commander in chief.		2.20 a. m.	To commander in chief: Steamer report. 29 V 6 p. m. 5 miles NE. Hanstholm lightship one submarine nationality not known. Course toward Skagen.
Helgoland Island	Entrance III	0405	4.06 a. m.	To fleet: Air reconnaissance impossible for the present owing to weather conditions. Signed Air station, Helgoland.
List	do	0415	4.18 a. m.	To fleet: Air scouting not possible at present account unfavorable weather.
Commander in chief	Commander hospital ships.			Hold hospital ships in readiness at their anchorages.
*Arcona	Entrance III	0650	6.37 a. m.	To fleet: 2 capital ships, 2 cruisers, and several destroyers 099y III on southerly course. Signed U–32.
Commander in chief	Screen	0652		Main body will steer from square 100a VII toward 046e IV.
*Neumunster	Entrance III	0700	7.40 a. m.	To commander in chief: 2 large warships or groups with destroyer escort left Scapa Flow.
Arcona	do	0744	7.48 a. m.	From U–66 to commander in chief: 8 enemy capital ships, light cruisers, destroyers on northerly course in 132b III.
Commander Scouting Division II.	Scouting Division II, Flotillas II and IV.	Visual	8.50 a. m.	Scouting Division II, Flotillas II and IV scout on bearing NW. to NE. in this order: Elbing, Pillau, Frankfurt, Wiesbaden, Regensburg.
Commander in chief.	Screen	0950		Screen close at 5 p. m. to visual signal distance.
*Hamburg	Fleet	1035		U–72 sighted Wednesday evening 3 light cruisers, Cordelia class, 2 submarines near the Skagerrak course east, and on Thursday evening one light cruiser Calliope class in latitude of Utsire course W.
Nordholz	Entrance III	1115	11.32 a. m.	To commander in chief: Air reconnaissance will be attempted. Signed Naval Airship Detachment.
Arcona	do	1150	12.26 p. m.	To leader of submarines: Two enemy submarines in 138y on course N. sig. U–67.
L–9	do	1225	12.49 p. m.	To commander in chief: Have ascended; course WNW.
*Neumunster	do	1118	12.55 p. m.	To commander in chief: Weather report for Firth of Forth: Wind 1, rainy, misty. Barometer 767. (These reports only made when ship detachments are at sea.)
Commander in chief	Fleet	Visual	12.53 p. m.	Course N.
L–16	Entrance III	1230	1.04 p. m.	To commander in chief: Have ascended. Course W. by N.
L–21	do	1235	1.10 p. m.	To commander in chief: Ascended on course to 092e III for scouting.
L–23	do	1300	1.16 p. m.	Ascended on course N. by W.
*Airstation List	Fleet flagship	1315	1.19 p. m.	Took off: Plane 559 radio wave 553, at 1.15 p. m. from List. Mission: Scout to westward. Landed: 2.11 p. m. Result: Scouted over 159b. Returned account very low clouds. Visibility 1 to 2 miles.
Arcona	Entrance III	1316	1.20 p. m.	All ships. In message 0650 from the U–32 the group number should probably have been V and not III.
L–14	do	1330	1.46 p. m.	To commander in chief: Ascended on course toward Horn Reef.
*L–23	do	1500	2.17 p. m.	To commander in chief: Position 129b. Visibility ½ mile.
L–16	do	do	2.20 p. m.	To commander in chief: Position 64e. Very misty. Visibility 4 miles. Course WNW.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31—Continued				
*L–21	Entrance III	1500	3.20 p. m.	To commander in chief: 104b. Visibility 6 miles, wind W. by N. 3, clouds about 300 meters.
*Elbing	Commander in chief	1531	3.27 p. m.	Enemy armored cruiser in sight W. by N.
Lutzow	Scouting Division I.	Visual	do	Turn together to port to WSW.
*B–109	Regensburg	1525	3.28 p. m.	To second leader of destroyers: 164y IV, scattered enemy vessels. Signed, Commander Fourth Half Flotilla.
Lutzow	Scouting Division I.	Visual	3.29 p. m.	Speed 18 knots.
Do	do	do	3.30 p. m.	Follow the leader.
Frankfurt	Regensburg, Wiesbaden.		do	Close this ship.
Lutzow	Scouting Division I.	Visual	3.32 p. m.	Speed 21 knots
B–109	Regensburg		do	To second leader of destroyers: Reported enemy forces steering east. Signed, Fourth Half Flotilla.
Elbing	Commander in chief.	1534	3.33 p. m.	Am under fire.
Lutzow	Scouting Division I.	Visual	3.34 p. m.	Clear ship for action.
*Do	Commander in chief.	1527	3.35 p. m.	Smoke of several enemy craft in sight in 164y. Signed, Commander scouting forces.
Do	Scouting Division I.	Visual	3.36 p. m.	Full speed.
*B–109	Regensburg	1535	3.38 p. m.	Recognition signal of the enemy is "P L." Signed Fourth Half Flotilla
*Lutzow	Commander in chief.	1536	3.43 p. m.	Scouting Division I is in 031e, course SSW
L–9	Entrance III	1540	do	To commander in chief: Position 020b. Visibility 2 miles; course NW. by W
Lutzow	Scouting Division I.	Visual	do	Turn together to starboard to course WSW.
Do	do	do	3.44 p. m.	Speed 18 knots.
Do	do	do	3.47 p. m.	Turn together to starboard course W.
Do	do	do	3.50 p. m.	Battle signals follow. Man battle signal stations.
Do	do	do	3.49 p. m.	Speed 21 knots.
Do	do	do	3.52 p. m.	Turn together to course NNW.
Commander in chief	Commander scouting forces.	1548	3.55 p. m.	Own main body at 3.45 p. m. in 065e, IV.
Frankfurt	Commander in chief.	1550	3.55 p. m.	047d not armored cruisers, but 4 light cruisers Calliope class on course NW. Signed, Commander Scouting Division II.
Lutzow	Scouting Division I.	Visual	3.57 p. m.	Follow in order of tactical numbers.
Elbing	Lutzow	1526	3.59 p. m.	4 enemy cruisers Arethusa class in sight.
Lutzow	Scouting Division I.	Visual	3.59 p. m.	Course NNW.
Do	do	do	4 p. m.	Speed 23 knots.
Commander in chief	Battle Squadrons I and II.	1704		Close up.
Do	Fleet	1706		Clear ships for action. Full speed, course N.
*Elbing		Visual	4.12 p. m.	4 modern enemy cruisers in sight to the westward, fifth and sixth coming in sight, distant 16,300 meters.
Lutzow	Scouting Division I.	do	4.15 p. m.	Course NW.
*Do	Commander in chief.	1650	do	Only 4 enemy light cruisers in sight. Position Scouting Division I, 022e course NNW.
Do	Scouting Division I.	Visual	do	Speed 25 knots.
Elbing	Fleet flagship	1615		To commander in chief: Scattered enemy forces in 152y IV.
Do	Commander in chief.	1612	4.15 p. m.	Reported enemy forces steering NNW. 152y IV.
*List	do	1600	4.21 p. m.	Radio airplane 561 taking off on course NNW. Signed, List Air Station.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31—Continued				
Frankfurt	Commander in chief.	1614	4.24 p. m.	Have opened fire on enemy light cruisers.
Lutzow	Scouting Division I.	Visual	do	Speed 18 knots.
Friedrich der Grosse	Fleet		4.26 p. m.	Distance 700 meters.
Lutzow	Scouting Division I.	Visual	do	Course NW. by N.
*L-9	Entrance III	1550	do	To commander in chief: Position 005b. Have turned about; starboard propeller shaft broken.
*Lutzow	All	1629	do	Scouting Division II close Scouting Division I. Strong enemy forces in sight in 151y.
*Do	Scouting Division I.	Visual	4.29 p. m.	Fire distribution from the right.
Do	do	do	4.32 p. m.	Speed 18 knots.
Do	do	do	4.35 p. m.	Course SE.
*Do	All	1629; visual	do	Enemy main body in sight in 151y. This force consists of 6 ships on course N.
Frankfurt	Fleet		4.37 p. m.	Scattered enemy craft 159y. Follow as quickly as possible. Signed, Commander Scouting Division II.
Lutzow	Scouting Division I.	Visual	4.39 p. m.	Fire distribution from the left.
*Do	do	do	4.40 p. m.	Speed 18 knots.
*Frankfurt	Lutzow	1633	do	Enemy airplane in 159y. Commander Scouting Division II.
Friedrich der Grosse	All	Visual	do	Full speed.
*Frankfurt	Commander in chief.	1628	4.41 p. m.	The enemy light cruisers have turned off. Have ceased firing.
*Lutzow	Scouting Division I.	Visual	4.42 p. m.	Ships take distance 500 meters.
Do	do	do	4.45 p. m.	Change course together to SSE.
*Do	Scouting Division I.	do	4.48 p. m.	Commence firing.
Do	All	1632	4.49 p. m.	Scouting Division I. Position 004e, SE. Speed is 21 knots.
Do	Scouting Division I.	Visual	4.35 p. m.	Increase speed.
Do	do	do	4.54 p. m.	Leading ship is guide.
*Do	All	1648	do	6 enemy battle cruisers, light enemy forces in 151y, course SE. Scouting Division I in 004e, course SSE, 18 knots. Am engaged in battle with 6 battle cruisers. Report position own main body. Signed, Commander scouting forces.
Do	Scouting Division I.	Visual	5 p. m.	Change course together to SE. by S.
Second leader of destroyers.	Flotilla IX	do	5.03 p. m.	Interval 15,500 meters.
Lutzow	Scouting Division I.	do	5.04 p. m.	Change course together to S. by E.
Commander in Chief	All		5.05 p. m.	Course NW.
Do	Fleet; commander scouting forces.	1709	do	Own main body position 5 p. m. 043e center, course NW., speed 15 knots.
Lutzow	Scouting Division I.	Visual	5.07 p. m.	Change course together to S. by W.
Friedrich der Grosse	All	do	5.11 p. m.	Ships take distance 500 meters.
Lutzow	Scouting Division I.	do	5.12 p. m.	Speed 23 knots.
Do	do	do	5.14 p. m.	Destroyers attack.
Do	do	do	5.18 p. m.	Leading ship take guide.
Commander in chief	All	do	5.20 p. m.	Course West.
*Do	Rostock	1721	do	First leader of destroyers: Concentrate main body destroyers.
*Frankfurt	Lutzow	1712	do	Enemy main body 151y, English Second Battle Squadron, 5 ships. Reported enemy force steering SE.
Frederich der Grosse	All	Visual	5.21 p. m.	Course N.
Lutzow	Scouting Division I.	do	5.25 p. m.	Reduce speed.
Second leader of destroyers.	Flotilla IX	do	5.26 p. m.	Distance 10,000 meters. Flotilla IX attack.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31—Continued				
V–29	Flotilla IX	Visual	5.26 p. m.	Attack.
Lutzow	Scouting Division I.	do	5.27 p. m.	Turn together to SE.
*Stettin	Fleet	do	5.28 p. m.	Gunfire to NNW. ½ W., distant about 4 miles.
*Commander in chief	Lutzow	1731	5.30 p. m.	To commander scouting forces: Own main body 034e, course N. Speed, 15 knots.
Lutzow	Scouting Division I.	Visual	5.34 p. m.	Change course together to ESE.
Frederich der Grosse	All flotillas	do	5.35 p. m.	Take station to starboard.
Do	All	do	5.36 p. m.	Increase speed.
Lutzow	Scouting Division I.	do	do	Change course to E.
Stettin	Frederich der Grosse	do	do	Scouting Division II in sight NNW. ¼ W.
Lutzow	Scouting Division I.	do	5.38 p. m.	Change course together to SSE.
L–14	Entrance III	1715	5.40 p. m.	To commander in chief. Position 140a-VII, on course to 151y IV, visibility 3 miles.
Lutzow	Scouting Division I.	Visual	5.41 p. m.	Change course together to SSW.
Frederich der Grosse	Fleet	do	5.42 p. m.	Divisions change course together 2 points to port.
*Lutzow	Scouting Division I.	do	5.44 p. m.	Scouting Division I: Open fire on enemy battleships.
*Frederich der Grosse	All	do	5.45 p. m.	Fire distribution from right, ship against ship.
*Do	do	do	5.46 p. m.	Commence firing.
Lutzow	Scouting Division I.	do	do	Change course together to SE.
Do	do	do	5.49 p. m.	ading ship take guide.
Do	do	do	5.51 p. m.	Course N.
Frederich der Grosse	Fleet	do	do	Operate against rear of enemy column.
Do	do	do	5.53 p. m.	Annul last Signal.
Do	do	do	5.54 p. m.	Increase speed.
Lutzow	Scouting Division I.	do	5.55 p. m.	Course N.
*Do	do	do	5.57 p. m.	Fire distribution from right, ship against ship.
Commander in chief	All		5.58 p. m.	Divisions change course together 2 points to port. Course NW; maximum speed.
Lutzow	Scouting Division I.	Visual	6.02 p. m.	All battle cruisers reduce speed.
Commander in chief	All		6.05 p. m.	Divisions change course together 2 points to starboard. Course NW.
Lutzow	Scouting Division I.	Visual	6.06 p. m.	All battle cruisers increase speed.
Do	do	do	6.10 p. m.	Battle cruisers change course together to N. by w.
Commander scouting forces.	Second leader of destroyers.	do	do	Please concentrate destroyers on starboard bow.
*Frankfort	Commander in chief.	1737	do	All ships. Van of enemy battle cruisers 006e right upper. Only four ships strong. Reported enemy vessels steering SE. Signed, Commander Scouting Division II.
Lutzow	Scouting Division I.	Visual	6.13 p. m.	All battle cruisers change course together to NNW.
Commander in chief	All		6.15 p. m.	Divisions change course together 2 points to port.
Lutzow	Scouting Division I.	Visual	6.17 p. m.	Battle cruisers reduce speed.
*Commander in chief	Lutzow	1821	6.19 p. m.	Commander scouting forces: Take up pursuit of enemy.
Lutzow	Scouting Division I.	Visual	6.23 p. m.	Battle cruisers increase speed.
Commander in chief	All		6.25 p. m.	Increase speed.
Lutzow	Scouting Division I.	Visual	6.26 p. m.	Battle cruisers change course together to NW.
L–14	Entrance III	1810	6.27 p. m.	To commander in chief: Position 091eIV. Course N. by E.
Friedrich de Grosse	All	Visual	6.30 p. m.	Divisions change course together 2 points to starboard.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31—Continued				
Lutzow	Scouting Division I.	Visual	6.39 p. m.	Battle cruisers. Leading ship take guide.
L–21	Commander in chief.	1830	6.40 p. m.	4068y. Visibility 6 miles.
*Lutzow	Moltke	Visual	do	Shift main battery to battleships.
Commander in chief	All		6.44 p. m.	Leading ship take guide. Divisions change course together to N.
Lutzow	Scouting Division I.	Visual	do	Battle cruisers change course together to NNE.
Do	do	do	6.50 p. m.	Battle cruisers change course together to N.
Commander in chief	All	do	6.51 p. m.	Reduce speed.
Lutzow	Scouting Division I.	do	6.53 p. m.	Battle cruisers. Leading ship take guide.
Do	do	do	6.55 p. m.	Battle cruisers change course together to E.
Commander in chief	All	do	do	Increase speed.
Wiesbaden	Twelfth Half Flotilla.		6.58 p. m.	Turn away. Full speed.
*Lutzow	Scouting Division I.	Visual	do	Destroyers attack.
Do	do	do	6.59 p. m.	Change course together to starboard to column on reverse course.
Do	do	do	7 p. m.	Reduce speed.
*Frankfurt	Lutzow		do	Am under fire from enemy battleships.
*Wiesbaden	Commander Scouting Division II.		7.01 p. m.	Both engines broken down. Unable to maneuver.
Second leader of destroyers.	Flotillas II, VI, IX.		7.02 p. m.	Dead ahead of leading ship (i. e., take position).
*Frankfurt	Derfflinger	1701	do	To commander scouting forces and commander in chief. Am under fire of enemy battleships. Signed, Commander Scouting Division II.
*Do	Commander in chief.	1906	7.10 p. m.	Enemy battleships in 025e. Signed, Commander Scouting Division II.
Do	do	1921	do	Wiesbaden disabled. 024e.
*Lutzow	Scouting Division I.	Visual	do	Turn together to starboard to column on reverse course.
*Commander Scouting Division II.	Regensburg		7.14 p. m.	Send destroyer to Wiesbaden. Take her in tow.
Do	Lutzow		7.15 p. m.	Wiesbaden disabled on starboard bow.
Konig	Squadron III		7.17 p. m.	Change course together 2 points to port.
Commander in chief	All		7.18 p. m.	Do.
Lutzow	Scouting Division I.	Visual	7.20 p. m.	Change course together to SE.
*Derfflinger	Commander in chief.	1850	do	Scouting Division I is turning off, as no observations possible on account of sun.
Commander in chief	Fleet		7.21 p. m.	Leading ship take guide.
Leader Flotilla V	Commander in chief.	1730	7.25 p. m.	According to reports of prisoners from destroyer Nomad, 60 large ships in vicinity, including 20 new battleships and 6 battle cruisers.
Second leader of destroyers.	Flotilla II	Visual	7.27 p. m.	Follow the leader.
Commander Scouting Division I.	do	do	do	Make room.
Friedrich der Grosse	All	do	7.28 p. m.	Maneuver with changes of course together.
Rostock	Flotilla III	do	7.32 p. m.	Concentrate in proper order for attack.
*Commander in chief	Fleet	do	7.36 p. m.	Turn together to starboard to reverse course (ships right about).
*Rostock	Flotilla III	do	7.37 p. m.	Attack. Toward port bow.
*Leader Flotilla III	do	do		Fire on turning to starboard, 3 torpedoes each.
*Rostock	Flotilla III, First Half Flotilla.	do	7.39 or 7.42 p. m.	Destroyers will not attack.
Commander in chief	All	do	7.39 p. m.	Course W.
*Rostock	First Half Flotilla.	do	7.40 p. m.	Destroyers will not attack.
Moltke	Commander in chief.		7.45 p. m.	Enemy van bears E. by S.
L–23	do	1930	7.47 p. m.	7.30 p. m. 4163b, course SSW.
Deutschland	Squadron II	Visual	7.50 p. m.	Turn together 2 points to starboard.
*Second leader of destroyers.	Flotilla VI	do	7.52 p. m.	Destroyers attack.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31—Continued				
Second leader of destroyers.	Flotilla IX	Visual	7.54 p. m.	Destroyers attack.
*Commander in chief.	All		7.55 p. m.	Turn together to starboard to reverse course. (Ships right about.)
Rostock	First and Twelfth Half Flotillas.		do	Boats proceed to Lutzow and take off commander scouting forces.
*Lutzow	Moltke	Visual	8 p. m.	Lutzow can proceed only at half speed. (Repeated to commander in chief by radio.)
*Commander in chief.	First leader of destroyers.	do	do	Take off crew of Wiesbaden.
Lutzow	Moltke	do	do	To Seydlitz; Commander scouting forces will transfer flag to the Seydlitz.
*Rostock	Flotilla III	do	do	Proceed to Wiesbaden; save crew.
Commander in chief.	Fleet	do	8.02 p. m.	Reduce speed.
Rostock	Flotilla III	do	8.03 p. m.	3 boats to the Wiesbaden; rescue the crew. Bearing NE.
*S-53	V-71	do	do	Proceed with your 3 boats to the Wiesbaden to rescue the crew.
Rostock	S-53	do		Flotilla III, advance quicker.
Derfflinger	Scouting Division I.	do	8.05 p. m.	All battle cruisers follow the leader.
*Rostock	Friedrich der Grosse.		do	Markgraf has port engine disabled, and can not maintain station. Signed Markgraf.
Commander in chief.	Rostock	Visual	do	Send assistance to Wiesbaden.
Derfflinger	Scouting Division I.	do	8.10 p. m.	Increase speed.
*Commander in chief.	Fleet		8.13 p. m.	Battle cruisers turn together at the enemy. Attack.
*Derfflinger	Scouting Division I.	Visual	8.14 p. m.	Turn together at the enemy.
*Commander in chief.	Fleet	do	8.15 p. m.	Battle cruisers operate against enemy van.
*Derfflinger	Scouting Division I.	do	do	Operate against enemy van.
Do	do	do	do	Speed 23 knots.
L-14	Commander in chief.	2000	do	Position 4051e. Visibility 2 miles, course NW.
*Elbing	Commander Scouting Division II.		do	One condenser leaking. Can not make high speed.
*Commander in chief.	Fleet		8.18 p. m.	Turn together to starboard to reverse course. (Ships right about.)
Deutschland	Squadron II	Visual	8.20 p. m.	Course NW.
Commander in chief.	Fleet		do	Increase speed.
*Do	do	Visual	8.21 p. m.	Destroyers attack.
*Rostock	All flotillas	do	do	Concentrate in proper order for torpedo attack.
Commander in chief.	Fleet		8.22 p. m.	Course W.
*Rostock	All flotillas	Visual	8.23 p. m.	Advance for attack. At the enemy.
Deutschland	Squadron II	do	8.25 p. m.	Course W.
Commander in chief.	Fleet		8.27 p. m.	Course SW., speed 17 knots.
L-21	Entrance III		8.28 p. m.	Commander in chief: 036dVII, course S., visibility 2 miles; very misty.
*V-30	Second leader of destroyers.	Visual	8.32 p. m.	Strong enemy ships to SE.
Frankfurt	Commander in chief.	2022	8.42 p. m.	Lutzow under fire from strong enemy forces to NE. Signed, Commander Scouting Division II.
Frederich de Grosse	Fleet	Visual	8.45 p. m.	Course S.
*Leader Flotilla II	Second leader of destroyers.	2040	8.48 p. m.	To commander in chief, and commander scouting forces: Reported enemy force steering ESE. Enemy force comprises more than 20 ships.
Frederich de Grosse	Fleet		8.52 p. m.	Course S.
*Commander in chief.	First and second leaders of destroyers.		9 p. m	All flotillas attack.
*Brugge	Commander in chief.	2011	do	Intercepted English radio, warship "bt" to "ak," "jv": "Cruisers bearing south, 5 miles."
G-39	Moltke	Visual	do	Is your radio in working order? Signed, Commander scouting forces.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31—Continued				
Moltke	G–39	Visual	9 p. m	Only auxiliary (Z) station in order.
Lutzow	Seydlitz		9.01 p. m	Enemy bearing SSE.; is passing ahead of Lutzow to port; 6 battle cruisers.
Commander Scouting Division II.	Regensburg	Visual	9.05 p. m	Enemy bearing SSE; passing to port ahead of Lutzow; 6 battle cruisers.
Second leader of destroyers.	Flotilla II			Enemy bearing SSE.; is passing to port ahead of Lutzow; 6 battle crusiers.
*Seydlitz	Commander in chief.	2050	9.06 p. m	Derfflinger has only two guns ready for action.
*Do				Port engine of Markgraf disabled. Signed Markgraf.
*Second leader of destroyers.	Flotilla II		9.08 p. m.	Flotilla II will be dispatched for search and night attack against enemy battle fleet at 9.45. Enemy assumed to be in sector E. to NE. Initial point for 9.30 will follow. Return of flotilla around Skagen to Kiel authorized if route to German Bight not found advisable. To the southward of you other flotillas will operate. I will radio my 1 a. m. position.
*Hamburg	Arcona	2050	9.10 p. m	Third Half Flotilla, U–53, U–67. All available submarines and U–67 advance immediately to north. Report 6 a. m. position. Leader of submarines.
Second leader of destroyers.	Flotilla II		do	The sector ordered for search operations changed to ENE. to ESE.
Commander in chief	First and second leaders of destroyers.	2112	9.15 p. m	All flotillas attack at night under first leader of destroyers.
Second leader of destroyers.	Flotilla II and Twelfth Half Flotilla.		do	Flotilla II and Twelfth Half Flotilla proceed on duty assigned.
Do	Flotilla VI and Twelfth Half Flotilla.		do	At 9.45 proceed against the enemy in sector ESE. to SE. Position at 9.30 p. m. 161y.
Frankfurt	Commander in chief.	2119	9.19 p. m	162y right center. Two ships of Chatham class. 008e enemy armored cruisers on course SW. Signed, Commander Scouting Division II.
Stettin	do	2121	9.21 p. m	4 enemy light cruisers in 007e. Signed, Commander Scouting Division IV.
	Note		9.25 p. m	Commander Battle Squadron II tries to get Scouting Division IV to take position ahead of the main body.
Regensburg	Commander in chief; first leader of destroyers.	2126	9.30 p. m	From 161y, at 9.30 p. m. Flotilla II advanced in sector ENE. to ESE. Twelfth Half Flotilla ESE. to SE. Flotillas dispatched before 2112. Signed Second Leader of Destroyers.
*Rostock	Commander in chief.	2131	9.35 p. m	Second Leader of Destroyers will order dispositions of boats under his command. Signed, First leader of destroyers.
Commander in chief	Fleet		9.36 p. m	Course S.
L–14	Commander in chief.	2100	9.41 p. m	Position 4023e; course SSE.; visibility 1 mile.
S–53	Regensburg		9.45 p. m	5 boats of Flotilla III assembled. Request orders and position.
Regensburg	Flotilla III		9.45 p. m	Remain here.
Commander in chief	Fleet		9.52 p. m	Course S.
Rostock	Commander in chief.	2150	9.57 p. m	Flotilla III report position. Signed, First leader of destroyers.
Commander in chief	Von der Tann	P. D. L.	10. p. m	Close battle cruisers.
G–39	Moltke	Visual	do	Report condition of armament. Signed, Commander scouting forces.
*Moltke	G–39	do	do	Main battery in readiness for action. Also greater part secondary battery. Z station and WWO clear. 300 tons water in the ship.
*Rostock	Commander in chief.	2156	10.02 p. m	Flotillas V and VII. Flotilla VII advance from 165y sector SE. to SbyE. Flotilla V sector SbyE. to SSW. Signed First leader of destroyers.
*Commander in chief	Naval Airship Detachment.	2206		Early air reconnaissance near Horn Reef very essential.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
May 31—Continued				
*Regensburg	Commander in chief.	2200	10.08 p. m.	Flotillas II and VI, 10 p. m. position of rear ship own main body 165y lower, course south.
Rostock	do	2158	10.09 p. m.	First leader of destroyers. Refer to 2150; 5 boats 165y near second leader of destroyers. Signed, Flotilla III.
*Commander in chief.	Fleet	2214	10.10 p. m.	Course of main body SSE. ¼ E. Maintain this course. Speed, 16 knots. Battle cruisers rear of column. Squadron II rear of battle fleet.
König	Commander in chief.	2205	10.15 p. m.	Lutzow in 007e has been lost to view. Course S., slow speed. Commander Battle Squadron III.
*Commander in chief.	Fleet	2229		Squadron II, behind Squadron III. Battle cruisers in rear. Scouting Division II ahead, Scouting Division IV to starboard.
Hannover	Commander in chief.	2217	10.30 p. m.	Enemy in sight ahead, 4 ships, 166y. Signed, Rear Admiral of Battle Squadron II.
G-39	Moltke	Visual	do	Please sheer out to port and stop. Signed, Commander scouting forces.
Rostock	Commander in chief.	2239	10.40 p. m.	To Eighteenth Half Flotilla: Refer to 2217. Attack enemy. Signed, First leader of destroyers.
Commander in chief.	Fleet	2246	10.45 p. m.	Own main body course SSE. ¼ E.
B-98	Rostock	2150	10.48 p. m.	To all ships: 020e, 5 enemy light cruisers, numerous destroyers. Am being forced off; am steering NW. Signed, Flotilla II.
	Note		10.50 p. m.	Battle Squadron II turned together to reverse course to port and with a second change to port closed the rear of the column after König.
G-39	Moltke	Visual	do	Commander scouting forces will shift flag to the Moltke.
Moltke	G-39	do	10.55 p. m.	Moltke is stopped.
Rostock	Commander in chief.	2248	do	To Eighteenth Half Flotilla: Refer to 2239: Sector SSW. to SW. First leader of destroyers.
Frankfurt	do	2258	do	5 enemy cruisers on course ENE. in 017e. Signed, Commander Scouting Division II.
G-40	Rostock	2250	11.12 p. m.	To fleet, König and Lutzow: At 10.30 p. m. with 4 boats in 018e center, course SSW., 13 knots.
*Commander in chief.	G-42	2315	11.15 p. m.	Send group of destroyers to find Lutzow. Lutzow was lost to view at 9.30 p. m. in 007e on course S., slow speed. Report numbers of boats.
*Elbing	Commander in chief.	2319	11.22 p. m.	Fleet: Recognition signal of the enemy from 11 p. m. on is "u."
Rostock	do	2321	11.38 p. m.	Opened fire on enemy light cruisers and destroyers on southerly course in 012e. Signed, First leader of destroyers.
Commander in chief.	Fleet	2332	11.34 p. m.	Course of own main body SE. by S.
*Rostock	Commander in chief.	2332	11.36 p. m.	All flotillas: Concentrate by 4 a. m. near own main body in vicinity of Horn Reef; otherwise take course around Skagen. First leader of destroyers.
*Frankfurt	do	2333	11.45 p. m.	Fleet: The recognition signal of the enemy is "ua," not "u." Commander Scouting Division II.
S-24	Rostock	2302	do	Fleet: 054aVII, destroyers, course S. at high speed. Signed Flotilla VII.
Frankfurt	Commander in chief.	2302	11.46 p. m.	Am in battle with enemy light cruisers. Commander Scouting Division II.
König	do	2232	11.53 p. m.	Position, 007e; course S. by W., 11 knots. Where is enemy expected? Signed Lutzow.
June 1				
Commander in chief.	Westfalen	0002		Course SE. ¾ S. to Horn Reef Lightship.
Do	Fleet	0006		Position own main body midnight. 012e, course SE. ¾ E.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
S–52	Rostock	0003	12.15 a. m.	To commander in chief, First leader of destroyers: Please give exact position. Signed, Lutzow.
L–14	Commander in chief.		12.33 a. m.	To commander in chief: Position 158a-VII. Am returning to port.
S–32	First leader of destroyers, commander in chief.	0040	12.52 a. m.	070a, disabled.
*G–40	Commander in chief.	0005	12.55 a. m.	Lutzow can proceed only at slow speed. Navigational aids lacking. Position 016e; course S. Battery reduced to one-third strength.
Frankfurt	do			4 enemy armored cruisers 093a. The reported enemy force on course SSE. (enemy interference).
Seydlitz	do		1.08 a. m.	4 enemy armored cruisers in 093a on course S.
*König	do	0101	1.09 a. m.	Rostock disabled. Signed Commander Battle Squadron III.
Second leader of destroyers.	Flotilla III		1.12 a. m.	3 boats proceed to burning ship to port.
L–22	Commander in chief.	2321	1.13 a. m.	Ascended for scouting. 12.55 a. m. position 122bVII, course N. by W. Nothing suspicious.
G–9	do	0110	1.16 a. m.	Enemy light cruisers in 069a, course S.
First leader of destroyers.	Flotilla III			One boat to the Rostock.
*G–101	Commander in chief.	0052	1.18 a. m.	Proceeding around Skagen. Flotilla II.
*Elbing	Flotilla III	Visual		Here Elbing. Am disabled. Please come alongside.
S–52	Commander in chief.	0130	1.31 a. m.	Position 016e. Enemy interfering with radio. Destroyers in sight, course S.
*Rostock	do	0132	1.32 a. m.	Torpedo hit 055a. Main radio station out of commission. Can make 17 knots.
G–9	do	0122	1.34 a. m.	To First leader of destroyers: Reported enemy light cruisers out of sight to SW.
*Frankfurt	do	0131	1.37 a. m.	Where is van of own main body at 1.30? Own position 106a center. Commander Scouting Division II.
Commander in chief	Lutzow; G–40	0144		Position own main body 1.30 a. m., 073a, SE. by S.
G–40	Commander in chief.	0117	1.47 a. m.	Commander scouting forces: Position Lutzow 1 a. m. 010e, course S., speed 7 knots.
*S–54	do	0137	1.51 a. m.	Rostock hit by torpedo, speed 15 knots, position 3 a. m. 077a. Signed, First leader of destroyers.
*S–53	do	0148	1.53 a. m.	Elbing disabled in 056a. Commander Flotilla III.
Commander in chief	Commander Scouting Division II, Frankfurt, Ostfriesland.	0203		Re 0131: Van of own main body at 2 a. m. 087a, VII, lower.
S–54	Commander in chief.	0200	2.05 a. m.	Rostock radio out of commission, please relay through another vessel.
Commander Flotilla III.	Regensburg	0205	2.20 a. m.	Elbing is barely afloat. Commanding officer requests instructions. Signed Flotilla III.
G–39	Commander in chief.	0204	2.27 a. m.	Moltke is 59a at 1.30 a. m., course S, speed 24 knots. Am forced off by 4 enemy battleships. Will seek to close fleet at dawn. Signed, Commander scouting forces.
*Regensburg	V–71		2.29 a. m.	V–71 and V–73 proceed to the Rostock.
*Nassau	Commander in chief.	0230		One cruiser with 4 stacks sunk by gunfire; one destroyer rammed. Have closed rear of Battle Squadron II. Maximum speed 15 knots.
L–22	Entrance III		2.31 a. m.	(Beginning missing * * *) N. by W., visibility 4 miles, in 68a several lights.
L–24	Commander in chief.	0203	2.35 a. m.	Am 087a, course NE. by N.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
Commander in chief	Flotilla III	0237	2.41 a. m.	To S–53: Save crew of Elbing; otherwise according to commanding officer's discretion.
*Regensburg	Commander in chief.	0259	2.46 a. m.	All flotillas assemble near van of Battle Squadron I.
S–32	Regensburg	0245	2.52 a. m.	For Lutzow: Position 089a VII; disabled.
*L–24	Entrance III	0240	2.55 a. m.	To commander in chief, naval airship detachment. Have been fired on without result in 069e IV by several surface craft.
Rostock	Second leader of destroyers.		2.57 a. m.	Please send destroyers to the Rostock.
*S–53	Regensburg	0250	3.01 a. m.	To commander in chief, I have practically all the crew of the Elbing on board. Am 086a at 3 a. m. Signed, Flotilla III.
Second leader of destroyers.	V–71, V–73			Go to assistance of Rostock.
L–17	Commander in chief.	0300	3.09 a. m.	Position 63e, steering NW. by N.
*Deutschland	do	0321	3.20 a. m.	Pommern destroyed by explosion in 103a. Signed Commander Battle Squadron III.
*Second leader of destroyers.	Flotillas VII, V			Destroyers with torpedoes ready for action take station for new attacks ahead of the battleship column. Boats without torpedoes assemble near Regensburg.
Commander in chief	Fleet	0331		Position own main body at 4.30 a. m. 101a right center. SE. by S., speed 16 knots.
L–24	Entrance III		3.47 a. m.	To commander in chief, Naval Airship Detachment: Further enemy light forces in 115e IV. I have * * * steer * * * ordered.
*A destroyer	Fleet		3.50 a. m.	V–4 destroyed by explosion near bow. According to commanding officer rammed by submarine. Greater part of the crew saved.
Frankfurt	Commander in chief.	0344	do	Position of Frankfurt, Pillau 3.30 a. m. 111a, course SE. by S., speed 16 knots. Signed Commander Scouting Division II.
*G–39	do	0305	3.55 a. m.	Derfflinger and Von der Tann have only two guns ready for action. Moltke has 1,000 tons water in hull. Seydlitz also damaged. Commander scouting forces.
L–14	Entrance III	0330	do	To commander in chief: Landing at Nordholz at 4.30 a. m.
G–39	Commander in chief.	0350	4.02 a. m.	Moltke at 3.30 a. m. in 117a left. Course SE. ¾ S., 18 knots. Commander scouting forces.
Oldenburg	Fleet	Visual	4.03 a. m.	Submerged enemy submarine in sight to starboard.
Friederich der Grosse	do	do	4.08 a. m.	Turn 4 points to starboard. (Turned back with flag signals.)
*L–24	Entrance III	0400	4.10 a. m.	To fleet: 4 a. m. numerous enemy craft in 036d VII, at least 12 units. Position 016d, course S.
Moltke	Commander in chief.	Visual	4.20 a. m.	Moltke will close Squadron I. Commander scouting forces.
Commander in chief	Commander scouting forces.	0424		Scouting Division I return to port.
*L–11	Commander in chief.	0410	4.30 a. m.	In 033b, 12 English battleships,, many light forces in sight, course NNE. at high speed.
*L–24	do	0415	4.33 a. m.	The reported enemy forces on course south at high speed. Am pursued by two cruisers in 029d, course N. by W.
Commander in chief	Regensburg	0414	4.35 a. m.	To G–40: Report position of Lutzow.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
*Commander in chief	Fleet	0438		Scouting Division II astern; Scouting Division IV ahead. First leader of destroyers dispose destroyers as submarine screen. Squadron II return to port.
Do	Moltke	Visual	4.50 a. m.	Position Friedrich der Grosse at 4.30 is 117a left center.
Ostfriesland	Fleet		do	Commanding officer Oldenburg wounded. Executive officer has assumed command.
Commander in chief	do	0454		Course SE. Return to port eastward of Amrum Bank.
Do	do	Visual	5.08 a. m.	Return to port by divisions.
G–8	do		do	Formed scouting line with Flotilla V, according to orders. During the night nothing occurred. Have remained standing by the V–4 to assist that boat.
S–53	Regensburg, commander in chief.	0454	5.15 a. m.	The commanding officer, executive, and torpedo officers and cutter's crew remained aboard Elbing to blow up ship in case the enemy is sighted. Signed Commander Flotilla III.
Regensburg	Commander in chief.		5.24 a. m.	From G–38 to commander scouting forces and commander in chief. At 2.45 a. m. the Lutzow abandoned and blown up.
*L–11	Entrance III	0500	5.33 a. m.	028a three enemy battle cruisers, course W. Weather very misty, contact difficult to maintain.
*Do	Commander in chief.	0440	5.35 a. m.	043b, 6 further enemy battleships, course N. turning to W. Am under fire and being forced away, have contact with enemy main body.
Ostfriesland	do		5.40 a. m.	In last night's action the Helgoland received one major-caliber hit over water line in side armor. A piece of this armor 1 meter in diameter passed through the second deck. Shell itself exploded outside. No dead or wounded. Leak has been stopped. Commander Squadron I.
*L–11	Entrance III	0510	5.47 a. m.	Reported enemy forces steering N. Scattered enemy light forces in 047a lost to view in the mists. Own course N. Position uncertain.
V–2	Rostock	0520	6 a. m.	To first leader of destroyers; fleet: V–4 destroyed by explosion near bow in 054y. 64 men and officers saved.
S–32	Regensburg	0525	do	To second leader of destroyers. First Half Flotilla, position at 5.30 a. m. 142a VII, course SE. ¾s. Speed 10 knots.
*V–71	do	0512	6.05 a. m.	To commander in chief. Rostock was blown up in 080a right center on approach of enemy forces. Crew on the destroyers.
Friedrich der Grosse	Hamburg	Visual	6.15 a. m.	To leader of submarines: Can you dispatch submarines to Elbing 056a VII?
L–24	Commander in chief.	0545	6.20 a.m.	Have been forced off by gunfire. Very misty in cruising altitude. Position 110e SW.
Do	do	0600	do	Have returned owing to freshening south wind and low clouds, position 098e IV.
Hamburg	do	Visual	do	To fleet: As radio damaged, please give the last order through the Arcona. Available submarines stood out last night to northward. Signed Leader of Submarines.
L–11	Entrance III	0450	6.25 a. m.	Position 0551a, nothing in sight. Visibility 2 miles own course S. by W.
L–24	Commander in chief.	do	do	In Skagerrak nothing suspicious. Position 105e IV. Will try regain contact with enemy.
*Ostfriesland	Fleet	Visual	do	Have run into mine.
Do	do	do	do	Parts of mine case found on deck.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From	To	Time group	Time received	Contents
June 1 Continued				
*Friedrich der Grosse	Squadron III	Visual	6.28 a. m.	Hold course.
Kaiserin	do	do	6.30 a. m.	Mines in sight to port.
Ostfriesland	Friedrich der Grosse.	do	6.35 a. m.	Three-horn mine 1915
Prinzregent Luitpold	do	do	6.38 a. m.	Mine appeared in the wake of this ship.
Friedrich der Grosse	Hamburg	do	6.40 a. m.	Return to port.
Ostfriesland	Commander in chief.	0629	6.46 a. m.	Ostfriesland struck mine 155b upper.
*Commander in chief	Arcona	0654		To Third Half Flotilla: Please dispatch available submarines to Elbing in 056a VII.
*Do	Fleet	0633	6.56 a. m.	Hold course on account danger of mines.
Deutschland	Commander in chief.	0511	7 a. m.	To Chief of Flotilla Forstmann: Send a Mine Sweeper Division to meet Squadron II to eastward of Amrum Bank. Signed Commander Squadron II.
Regensburg		Visual	7.03 a. m.	Torpedo tracks to port.
Frankfurt		do	7.06 a. m.	Submarine to starboard
Commander in chief	Naval Airship Detachment.	0708		Air reconnaissance no longer required.
L-22	Entrance III	0510	7.10 a. m.	Position 140e, course SSW., very misty; am landing at 7 a. m.; antenna is in.
L-11	do	0700	7.12 a. m.	Position 060a, nothing in sight, own course SW. by W. Visibility 3 miles. Position uncertain.
Friedrich der Grosse	Squadron III	Visual	7.27 a. m.	Friedrich der Grosse no damage.
S-52	Regensburg	0720	7.48 a. m.	Second leader of destroyers, Flotilla IX, commander in chief, commander scouting forces: Position 160a VII, course toward Horn Reef, speed 25 knots.
Westfalen	Commander in chief.	0700	7.58 a. m.	Have sunk 5 destroyers attacking during the night engagements, apparently Botha class; shot into flames the sixth. The 5 numbers of destroyers observed: 60, 93, 30, 78, 606.
L-17	do	0600	8.16 a. m.	091b. Have lost contact with enemy. Course to 080a, nothing suspicious.
Nordholz	do	0800	8.29 a. m.	All airships recalled. Signed Naval Airship Detachment.
G-11	do		8.30 a. m.	Flotilla V has 3 officers, 56 men from destroyer Nomad on board, including 7 badly wounded.
Moltke	do	0810	8.46 a. m.	Would propose that Moltke and Derfflinger proceed at full speed to the Jade after passing eastward at Amrum Bank to dock at high water. The Derfflinger can not anchor. Signed, Commander scouting forces.
Do	do	0830	8.48 a. m.	To Flotilla Forstmann: Please send Mine Sweeper Division I and available boats of Division III and harbor flotillas as submarine screen to meet the entering detachments. Signed, Commander scouting forces.
S-73	Fleet		8.50 a. m.	Have 8 prisoners on board from new destroyer Tipperary, which was destroyed in 072a. In the vicinity were two older boats disabled, which were destroyed. Signed Flotilla III.
Neumunster	Commander in chief.	0755	8.55 a. m.	The flagship of the English main body: In case nothing in sight by 9.30 turn to reverse course and search to north.
Helgoland Island	do	0820	do	Leader of submarines: U-33 has stood out to the northward. Signed, Second Half Flotilla.
S-53	do		9 a. m.	The commanding officer of the Elbing proposed to steer for Horn Reef with the rest of the crew which had remained on board in the cutter or with the ship, provided same could be kept afloat.
Regensburg	do	0906	10.06 a. m.	Flotillas I, III, IX, and VII report which, if any, boats are missing.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
Commander in chief	Commander Baltic forces.			Second leader of destroyers (through Neumunster): Flotilla II is returning around Skagen.
L–13	Commander in chief.	0800	9.25 a. m.	Position 7037y. Nothing suspicious. Twenty miles visibility; wind SW. by W. force 7; at 500 meters is strengthening. Proceeding to 017y(7).
S–24	Stettin	0916	9.26 a. m.	To second leader of destroyers: All boats present.
V–45	Regensburg	0800	9.35 a. m.	To second leader of destroyers: G–40 in tow of G–37 account damage in fight with destroyers. Position 8 a. m. 130a VII; speed 10 knots; proceeding to List; crew of Lutzow on board.
Kaiser	Friedrich der Grosse.	Visual	do	Kaiser received one hit major caliber in making the turn on starboard casemate armor. Shell remained in armor. Chief mechanic dangerously wounded. Outer hull and net gear damaged by the shell.
S–16	Fleet		9.45 a. m.	S–16 yesterday evening rescued two men from a mass of wreckage who claim to be the only survivors of the Indefatigable. Signed Flotilla VII.
Hamburg	Commander in chief.	0820	10.03 a. m.	Please give this to Brügge and Nauen for further transmission when traffic permits. Damaged ships expected to return from Skagerrak. Submarines off east coast to extend period of waiting one day if possible. U–24, U–32 proceed to Tyne. Signed, Leader of submarines.
S–32	Regensburg	0945	do	First Half Flotilla; First leader of destroyers (through Regensburg). Am finally broken down. Have anchored with Lyngvig lighthouse, distant 2 miles.
Neumunster	Commander in chief.	0930	10.15 a. m.	Damaged British ship, 8.15 a. m., about 027bVII, course SW. by W.
Do	do	1010	10.16 a. m.	9.45 a. m. Enemy main body in 100a, course N., speed 20 knots.
L–11	do	0810	10.19 a. m.	From G–38 to Commander Scouting Forces; First Leader of Destroyers: 7 a. m., G–40, V–45, with crew of Lutzow in 109a. G–40 can make only 10 knots. Please send supports. Report position to G–37.
Regensburg	do	0909	10.26 a. m.	Commander scouting forces, referring 0945 to commander in chief; Flotilla I. Propose S–32 be towed in by fishing boats. Second leader of destroyers.
Helgoland Island	do	0930	10.32 a. m.	Commander scouting forces, Commander First Group, Mine Sweeper Division III: All available boats meet the detachments to east of Amrum Bank. Mine Sweeper Division I, harbor flotilla, from Helgoland, S–127, are under way. Signed Flotilla Forstmann.
Do	do	0900	10.34 a. m.	Leader of submarines: U–53 proceeding toward 056a(7). Second Half Flotilla.
Thüringen	do		10.35 a. m.	Thüringen fired on enemy cruiser at 1 a. m. and set fire to her, putting her out of action. At 1.50 a. m. a burning light cruiser was taken under fire and put out of action.
Regensburg	do	1025	10.36 a. m.	To G–38, V–45: Report position at 10.30. Regensburg proceeding to meet you. Second leader of destroyers.
G–39	Regensburg	1024	10.40 a. m.	Regensburg for V–40, S–32, first and second leaders of destroyers: In re 0800 and 0915 propose: V–40 to be towed to the Elbe and thence to Kiel. I propose to meet S–32 and take her in tow. Please send another boat. Signed First Half Flotilla.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
Commander in chief	Third Submarine Half Flotilla.	1043		Referring to Neumunster 0930: Damaged English ship at 8.15 a. m. in 027b on course SW. by W. Send submarine to attack.
Prinzregent Luitpold	Commander in chief.	Visual	10.50 a. m.	No damage in battle. Signed Kaiserin.
Do	do	do	11 a. m.	Prinzregent Luitpold, no damage.
S–53	Regensburg	0921	11.07 a. m.	Second leader of destroyers, Fifth and Sixth Half Flotillas. Referring to 0906: Have no news of V–48 since yesterday 8 p. m. S–54 and G–88 none since to-day 2 a. m. Signed, Flotilla III.
Commander in chief	Fleet	1114		Commanders all detachments: All ships which are damaged and must return to port, report to Commander in chief; all other ships to Wilhelmshaven; Squadron II to the Elbe; one flotilla to Schillig Roads; one flotilla to Helgoland; one half flotilla from Helgoland to proceed during darkness to point where Elbing was lost to find rest of crew. The other flotillas return to port.
Posen	do		11.15 a. m.	Elbing broke through the formation this night and came into collision with the Posen. Posen destroyed one destroyer during day engagement yesterday and sank three during the night. Destroyer No. 30 and two others came up on the quarter. The last one turned off under smoke screen. The other two were disabled by gunfire. No. 78 came from ahead and was destroyed by Posen. Signed Rear Admiral Squadron I.
Commander in chief	Second leader of destroyers.	1116		Referring to 0945 from S–32: The half flotilla which is dispatched to Elbing will also rescue the crew of S–32.
Do	Commander Squadron III.	Visual	11.27 a. m.	Friedrich der Grosse suffered no damage.
Do	Fleet	1101	11.33 a. m.	All wounded men who have not already been decorated are hereby awarded the iron cross, second class.
List	Commander in chief.		12.02 p. m.	Seaplane 541 took off from List at 7.40 on course WNW. Landed in Helgoland. Nothing suspicious. Scouted over 160b, visibility 2 to 3 miles.
Do	do		12.03 p. m.	Seaplanes 291 and 507 took off at 8.35 a. m. toward 159b. Landed 9.20 a. m. List. Scouted over 144a, saw two own destroyers. Result of scouting: Nothing suspicious. Visibility 8 miles. Returned account of rain and increasing sea.
Do	do		12.30 p. m.	Seaplane 569 took off at 8.40 from List. Course WNW. Landed. Scouted over 149a and 167a. Result of scouting: Nothing suspicious. Visibility 5 miles. Returned account engine trouble.
Do	do	1045	12.05 p. m.	To commander in chief and commander scouting forces: Seaplanes 508 and 291 landed. Went over 158b and 152b and returned. Nothing suspicious. Visibility 1 mile.
Do	do	1130	12.08 p. m.	Seaplane 502 took off at 11.30. Course WNW. Landed 1.05 p. m. List. Scouted over 156b, 124b, and 148b. Sighted own craft 156b, course WNW. 148b, same. Nothing suspicious. Visibility 2–4 miles.
Nordholz	do	1157	12.09 p. m.	L–11, return to port. Fresh south winds. Report position. Naval Airship Detachment.
L–11	do	1045	12.12 p. m.	Landing Nordholz at 1 p. m.
Do	do	1210	12.20 p. m.	Naval Airship Detachment: To 1157; position 7167b.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
Regensburg	S–32	1038	12.20 p. m.	To Flotilla I: Have dispatched V–73 to Normands Deep to tow S–32.
Moltke	Commander in chief.		do	In the first part of the battle the following enemy ships were engaged: 3 Lions, 1 Tiger, and 2 Indomitables; later, 5 battleships definitely determined in battle. In the first part of battle 2 battle cruisers put out of action by Scouting Division I; one probably sunk. A destroyer asked in passing if it were known that the sunken battle cruiser was the Queen Mary, number of destroyer not known. Name of sunken battle cruiser not known. In the second part of the battle one older armored cruiser of the Sutlej type definitely known to be sunk, probably by torpedo from the Lutzow. Further, one light cruiser badly damaged and one destroyer sunk by the Von der Tann. Observed the sinking of one of own destroyers, severe damage to two others. Fate of the Wiesbaden not known here. Many heavy hits on the Lutzow; broadside torpedo compartment, central station, and fire-control central full of water. Radio and turret B out of action. Addenda: Flotilla VII reports: S–68 picked up two men in wreckage who claim to be the sole survivors of the Indefatigable. Signed, Commander scouting forces.
König	Fleet		12.45 p. m.	Damage to König: 8 major caliber hits, two 15-cm. hits. Damage: Forward magazines flooded, one oil-fired boiler and both anchor capstans out of commission. Torpedo net damaged. About 1,000 tons of water in hull, One surgeon, 29 men killed, 16 wounded.
Do	do	1226	do	To 1114: König, Grosser Kurfurst, and Markgraf must return to port. König and Grosser Kurfurst can not anchor. Signed, Commander Battle Squadron III.
Moltke	Commander in chief.	1025	12.50 p. m.	To Navy yard, Wilhelmshaven, captain of the port: Hold both docks ready at 1.15 p. m. to-day for the Moltke and Derfflinger. Further dry dock for the Moltke and floating dock for the Seydlitz priority. Signed, Commander scouting forces.
Helgoland Island	do	1247	12.57 p. m.	Radio from seaplane: 145b enemy submarine.
Neumunster	do	1030	1 p. m.	To 0930: Damaged enemy ship is being towed; speed 7 knots. Reference to ship reported in 027b VII.
Moltke	do		do	V–28 reports: Have two prisoners on board from Queen Mary, which was sunk. Further articles belonging to destroyer Laurel were picked up at point where she was sunk. Signed, Commander scouting forces.
Ostfriesland	do	1249	1.05 p. m.	Squadron I, Rear Admiral Squadron I Referring to 1114: Ostfriesland to dock; Nassau, Oldenburg to Wilhelmshaven Roads. Rest of squadron to Schillig Roads on patrol till morning. Signed Battle Squadron I.
Markgraf	do		1.10 p. m.	Most serious damage: Port engine out of commission. Leak near the stern. Can make 13 knots. Other minor injuries.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
Markgraf	Fleet		1.10 p. m.	Markgraf sunk one light cruiser with four stacks by gunfire. Hits were observed on another cruiser which then turned off.
Oldenburg	Commander in chief.	0555	do	Commander Squadron I: Yesterday this ship sank a damaged destroyer; at night two others, including No. 30.
Posen	Fleet		1.15 p. m.	Of the six ships of Squadron I here assembled the Rheinland and Helgoland must return to port for repairs to the capstan, on account of necessity for anchoring. Helgoland will try to anchor in Schillig Roads and remain on patrol until morning. Rear Admiral Squadron I.
Regensburg	V-71	0047	1.20 p. m.	Commander scouting forces, Flotilla V: Flotilla V on patrol duty Schillig Roads. Signed, Second leader of destroyers.
V-28	Commander in chief.	0910	1.33 p. m.	Second leader of destroyers: Referring to 0906: V-27, V-29, S-35 sunk. Signed Flot. IX.
Helgoland Island	Fleet	1335		11 a. m. 043y and 12.47, severe explosions.
Do	Commander in chief.	1051	1.37 p. m.	To Commander Patrol Flotillas: Have swept channel "f" to Amrum Bank Lightship. No mine fields. Second Half Flot. of mine sweepers.
Helgoland Air Station	do	1205	1.39 p. m.	To Commander scouting forces. List. Plane 557 has landed. 8 a. m. 160b; nothing suspicious. Visibility 2 to 4 miles.
Helgoland Island	do	1140	do	Helgoland intelligence service. Have swept position 8 to the Jade, then the Elbe. No mine fields. Position 11 a.m., position 4. Signed, Fourth Half Flotilla.
Do	do	1236	1.43 p. m.	Leader of submarines: Arcona for U-53: At dark advance to westward. Return on 3 June. Signed, Second Submarine Half Flotilla.
Do	do	1140	do	Fleet: Have to-day swept channel "f" "a," "c," and from position 8 to 1. Commander Flotilla Forstmann.
Do	do	1235	1.45 p. m.	Commander scouting forces: 11 a. m. and 1137, severe explosion to the westward.
Moltke	do	1330	2.04 p. m.	Patrol for to-day: Scouting Division IV. Signed, Commander scouting forces.
Air Station List	Commander in chief.	1250	2.06 p. m.	Seaplane 560 landed 9.20 136b, 9.45 120b. Nothing suspicious. Visibility 2–4 miles.
Do	do	1215	do	Seaplane 559 taking off, course NNW.
Do	do	1335	do	Seaplane 561 taking off over 156b.
Do	do	1305	do	Seaplane 503 landed 156b, own vessels, course NNW. 136b, 120a own vessels. Nothing suspicious. Visibility 2–4 miles.
		1315	do	Seaplane 559 landed. 12.50 in 165a own vessels, 1 p. m. in 152a. Nothing suspicious. Visibility 1 to 2 miles.
Westfalen	Fleet		2.13 p. m.	Westfalen, 2 killed, 1 severely wounded, 1 lightly wounded, including captain, as result of gunfire.
S-15	Regensburg	0145	2.16 p. m.	First leader of destroyers; Fleet: Prisoner stated with certainty destroyer of C class blown up shortly after opening fire. His destroyer was in the immediate vicinity. Signed, Flotilla III.
Pillau	do	1203	2.18 p. m.	Navy Yard, Wilhelmshaven.—Please send two strong pumping tugs to meet Seydlitz as soon as possible eastward of Amrum Bank. Signed Seydlitz.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 1—Continued				
Commander Mine Sweeper Division.	Commander in chief.	1341	2.23 p. m.	To commander scouting forces: Seaplane 483 in 147 and 146b has dropped three bombs where submarine submerged.
Stettin	Fleet		2.25 p. m.	During the night action, at 10 p. m., 2 cruisers with 4 stacks of Weymouth class was set afire by gunfire. Frauenlob lost to sight after a severe explosion; had considerable list. Signed, Scouting Division IV.
Regensburg	Commander in chief.	1431	2.37 p. m.	To commander scouting forces, Captain of the Port, Naval Station: Lutzow's crew is on board. Position at 2.30 p. m. point B; propose to enter locks at Wilhelmshaven at 6.30 p. m. G–40 is safe. Second leader of destroyers.
Do	do	1052	3.23 p. m.	Second leader of destroyers: Have the commanding officer and 65 prisoners of destroyer Nestor on board, and further 2 men from the Indefatigable who claim to be the sole survivors of that ship. Signed, S–16.
König	do	Visual	3.25 p. m.	To Commander Squadron III and Commander in Chief: Damage to Grosser Kurfurst: 6 major caliber hits, 3 leaks. Anchor engine out of commission. Torpedo net damaged. About 800 tons of water in ship. Two officers and 12 men killed; 10 wounded. Signed Grosser Kurfurst.
Pillau	do	1430	4.20 p. m.	Commander scouting forces: Position 162b center. Am proceeding over position 6, 5 to Jade. Speed 5 knots. Seydlitz.
V–73	Regensburg	1515	4.45 p. m.	To commander scouting forces: First and second leaders of destroyers; Flotilla Forstmann: Have S–32 in tow, position 156aVII, speed 9 knots. Course past Normands Deep, thence along shore. Wind increasing from W. Please send tugs to meet me.
Moltke	Commander in chief.	1634	4.58 p. m.	To Seydlitz: Have ordered what you required. Make use of Mine Sweeper Division I. If nothing else is possible try to place ship near Amrum Bank in a position where ship can be protected from submarine attacks and suitable for salvage work. Signed, Commander scouting forces.
Arcona	do	1230	5.20 p. m.	To Leader of submarines: 020b apparently a ship of Iron Duke class damaged with one destroyer on course SW. at moderate speed. Signed U–46.
Do	do	1105	5.22 p. m.	To Fleet; leader of submarines: Position 056a. Elbing not in sight. U–46.
Do	do	1405	5.24 p. m.	To Fleet: Have attempted attack on the ship. Signed U–46.
Deutschland	do		5.32 p. m.	Schlesien has bent propeller in passing over a wreck last night and must be docked. Can Schlesien dock at Hamburg or Kiel?
Neumunster	Kaiser	1530	6.10 p. m.	To Commander in chief: Strong enemy forces are retiring to the Firth of Forth.
Pillau	do	1720	6.15 p. m.	To commander scouting forces: 5 p. m. position 164b right center, course SE. Signed Seydlitz.
Arcona	do	1858	7.17 p. m.	Fleet, leader of submarines: U–19, U–22, and U–64 have searched place of sinking of Elbing and found no trace of ship or crew. Third Half Flotilla.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Times received	Contents
June 1—Continued				
Intelligence Service	Kaiser		7.40 p. m.	To commander in chief and commander scouting forces: The Regensburg on May 31 in afternoon put an English destroyer out of action, designated 04, and damaged two further destroyers. Reported by Regensburg.
Do.	do.	5.50	7.44 p. m.	S. S. Neumunster to commander in chief leader of submarines: *Secret* 1420 1744 1845 z. c. 4 n 82 shore station British east coast to "k. f." (Commander scouting forces and fleet flag.) Contents about as follows: Ship 00009 blown up; crew saved. Position has not as yet been deciphered. Signed, Deciphering Section.
Commander in chief	Fleet	2002	8.11 p. m.	According to reports from English prisoner, which are in agreement, the English battleship Warspite was sunk.
Ostfriesland	Commander in chief.		8.18 p. m.	The armored cruiser which was sunk early this morning by gunfire was either of the Shannon or Devonshire class. The first assumption is more probable, according to the silhouettes. Among the other burning ships there was in all probability a larger ship. Proof: One major caliber hit on Helgoland and further heavy shell splashes near Squadron I, as well as silhouette of battleship. Nassau ran down an enemy destroyer. Signed, Battle Squadron I.
Stettin	Kaiser	1937	8.43 p. m.	To commander scouting forces: The Frauenlob was lost to sight in 012eIV. Signed, Commander Scouting Division IV.
			9 p. m.	Seydlitz 165eVII upper center, steaming astern.
Arcona	Kaiser	1659	10.22 p. m.	Leader of submarines, First and Third Half Flotillas: Large mine ships (?) in addition to destroyers with enemy forces. Lively traffic English and neutral shipping near Humber. Have attacked large English destroyer with 4 stacks; severe explosion and sinking observed. Position 125y8–. Course toward Ameland Island. Signed, UB-21.
June 2				
Westfalen	do	2320	12.50 a. m.	To commander in chief, Commander Squadron I: The first destroyer sunk yesterday, No. 60, was probably a flotilla leader, since bow, stern, and broadside guns with shields were distinctly seen.
Intelligence Service	do		8.23 a. m.	To commander in chief: Rotersand reports at 8.20 a. m.: Tow with Seydlitz near outer Jade.
Regensburg	Fleet		9.31 a. m.	Of our boats the following were lost: V-27, V-29, S-35, V-4, V-48. Nothing known of Flotilla II. At beginning of night action there were 10 boats with me. Signed, Second Leader of Destroyers.
June 3				
		0230		To commander in chief: One cruiser with 4 stacks shot down. Collided with 1 destroyer. Then followed in rear of Squadron II. Maximum speed 15 knots. Signed, Nassau.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 3—Continued				
Intelligence Service	Kaiser		8.30 a. m.	S. S. Berlin Admiralty: 7.35 morning. For Commander in chief, Kz 9004, telegram from Amsterdam: Official report from London. In the naval battle we lost the Queen Mary, Indefatigable, Invincible, Defence, Black Prince, Turbulent, Tipperary, Fortune, Sparrowhawk, and the Ardent. Other ships are still missing. Signed, Naval Staff.
Commander in chief	Commander Squadron II.			To-day's conference on the developments of the battle showed that the determined holding of course by Squadron II under enemy fire relieved the battle cruisers from a critical situation. Squadron II has contributed to a large extent to the general results achieved. I wish to express my acknowledgment and my appreciation to you and your commanding officers for this and all other services rendered during the action. Signed, Commander in chief.
Stettin	Commander in chief.		4.30 p. m.	S. S. Schillig, to chief of staff of the fleet: With regard to the relief of the battle cruisers in the critical situation discussed to-day by Captain Hartog, it is not improbable that Scouting Division IV assisted in this, since at this time that force attacked 5 armored cruisers apparently of the Devonshire class. At this time Scouting Division IV was ahead of Squadron II and the firing of the latter was not heard. Further investigation will be made. Signed, Commander Scouting Division IV.
Commander in chief	Fleet	1731	6.07 p. m.	The certain destruction of the following vessels can be counted on: Queen Mary and Indefatigable prisoners from both ships. Further two older armored cruisers and at least 10 destroyers.
Naval staff	Commander in chief.	1005	6.46 p. m.	Kz 9096—News telegram: Frauenlob was struck by torpedo at midnight in engine room; ship sank immediately; five men of crew until 9 a. m. in boat; then picked up by Dutch steamer Texel. Later English destroyer 625 demanded Texel surrender prisoners, and the captain of Texel successfully protested. Later the survivors were turned over to the towing vessel Thames. According to this steamer many empty rafts were passed.
Admiralty	do		7.59 a. m.	Secret. Kz 9122. There are rumors here regarding the loss of the Lutzow and the Rostock. Questions expected from the press and the Reichstag regarding same. Please consult with the Secretary of the Navy in regard to how these questions should be answered, and give your suggestion for the wording to this office.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 3—Continued				
Commander in chief.	Admiralty	1013		Secret. To Kz 9122. In the event that the questions are not to be avoided suggest the following true statement of affairs be given in confidence: Lutzow and Rostock after the conclusion of the battle and on the return to port were blown up by their own commanding officers after the crew, including all wounded, had been taken off by the destroyers and since the ships could not be brought into port. The publication of these facts is not desired for military reasons, since the loss of these ships can not be known to the enemy. Further, the enemy losses published by us include only the total losses which were definitely determined by observation. The Secretary of the Navy has not been here but has received a copy of this.
International service.	Kaiser		11.30 a. m.	S. S. Berlin, to commander in chief. Kz. 9159. Aarhus report. Swedish steamer Para brought in 2 petty officers and 1 fireman from the V–48 which were saved 8 hours after the sinking. Assumed to be the only survivors.
June 4				
Brügge	Commander in chief.	0121	1.35 a. m.	The Flanders Submarine Flotilla took part in the operations with all boats according to the plan. All boats returned, only coast patrol encountered. Signed, Naval Corps Flanders.
June 5				
Commander in chief.	Admiralty		8.05 a. m.	For the press: According to report of Flotilla III a prisoner from the Turbulent wrote after being picked up that he had seen the sinking of the following ships: Warspite, Princess Royal, Turbulent, Nestor, Acasta, and certified to this over his signature. Two other prisoners confirmed this, although separated since being brought on board.
Do	do		5.00 p. m.	KB 1122. Flotilla V reports that prisoners state the Princess Royal had considerable list after sinking of Queen Mary, and that light cruiser Birmingham was sunk. It appears that 5 Queen Elizabeths took part in that action.
Naval staff	Commander in chief.		10.37 p. m.	Kz 9263. Attaché at Hague reports: English surgeon Burton of destroyer Tipperary, saved by Madlung, has stated that the light cruiser Euryalus was burning in vicinity of the sinking destroyer.
Do	do		4.35 p. m.	Kz 9321. Attaché Stockholm reports: Seaman Hugo Zenne from Jena, probably sole survivor of the Wiesbaden, saved by the Norwegian steamer Willy and landed in Dramme. Wiesbaden sunk by a torpedo.
Commander in chief.	Naval air station			BK 1045. Can L–11 give more definite information regarding types of battleships and battle cruisers sighted early on June 1. Report very valuable.

Summary of the most important radio messages and signals during the Battle off the Skagerrak—Continued

From—	To—	Time group	Time received	Contents
June 6				
Intelligence service	Kaiser		7.39 p. m.	S. S. Nordholz, to commander in chief. Secret. In re (KB 1045). Commanding officer of L–11 reports: The 6 rear ships first sighted, battleship group, had tripod masts, 2 stacks, and were believed to be either Bellerophon, Neptune, or Collingwood class. The type of the 6 leading ships could not be made out on account of the smoke and mists. The 6 battleships of the second group to the eastward also had tripod masts and 2 stacks. The 3 ships from the NE. had 2 tripod masts and 3 stacks and were made out as Australias or Invincibles. The battleships were steaming with 500 meters or less distance between units, speed 16 to 18 knots. The battle cruisers were steaming at high speed with intervals of about 800 to 900 meters between ships. Signed, Schutze.
Commander in chief	Admiralty			KB 1050. The following English prisoners have been taken: From Queen Mary, 1 ensign, 1 man; from Indefatigable, 2 men; Tipperary, 7 men, 2 wounded; Nestor, 3 officers, 2 warrant officers, 75 men, 6 wounded; Nomad, 4 officers, 68 men, 1 officer, and 10 of these wounded; from Turbulent, 14 men, all wounded; total, 177 English prisoners.

SKETCHES (34)

By Lieut. Commander H. H. Frost, United States Navy

Note.—The times used in these sketches are G. M. T. and are therefore one hour less than those used in the text.

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80498—26——18

Orders of British Admiralty - 30 May.

1. On 30 May, probably during the forenoon, the Admiralty received news which pointed to early activity on the part of the High Sea Fleet.

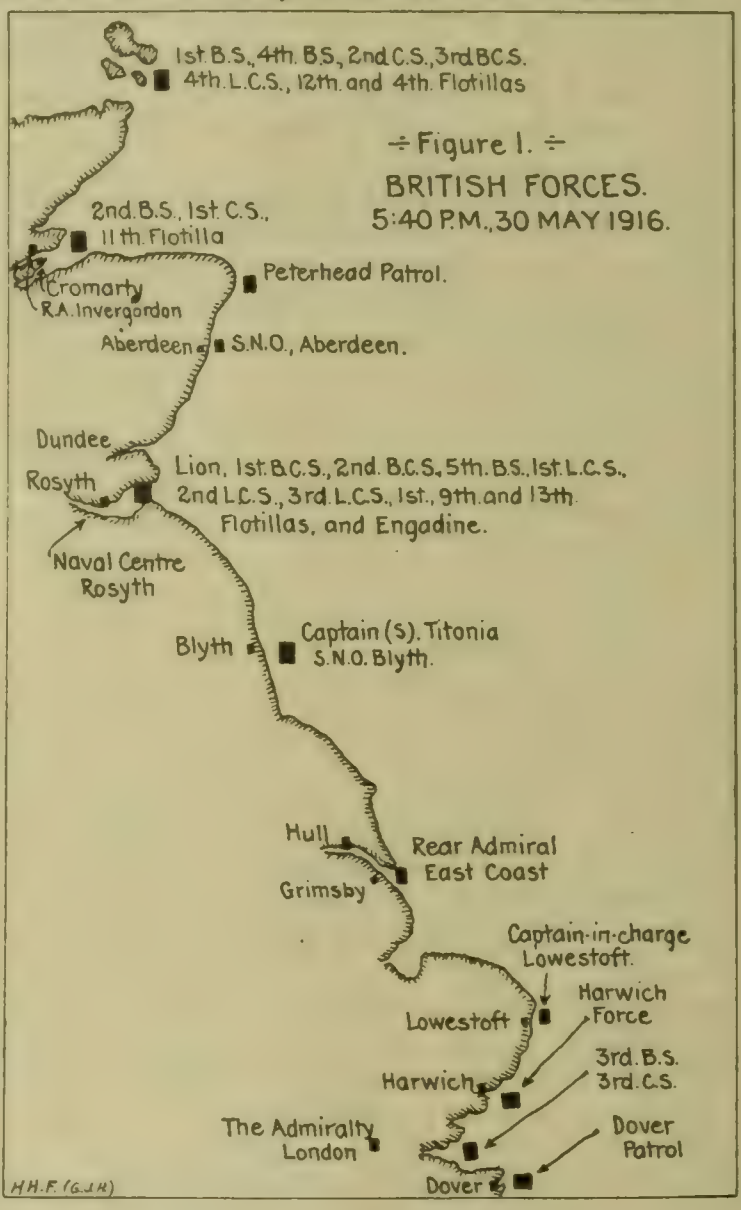
2. About noon the Admiralty ordered the Commander Dover Patrol to send the Harwich destroyers back to Harwich and to recall the Belgian coast patrol; the R.A East Coast to recall minesweeping sloops; the 3rd B.S and 3rd C.S. to have steam ready by daylight of the 31st; the submarines of the Harwich Force to be ready on short notice.

3. At 5:40 p.m the following message was sent to C in-C, G.F. at Scapa: "You should concentrate to Eastward of Long Forties, ready for eventualities"

4. At 5:40, S.O. 2nd B.S. made "Preparatory signal for leaving Cromarty"

5. At 5:40 C-in-C, G.F. made "Preparatory signal for leaving Scapa."

6. At 5:45 S.O. B.C.F made signal: "Raise steam for 22 knots."



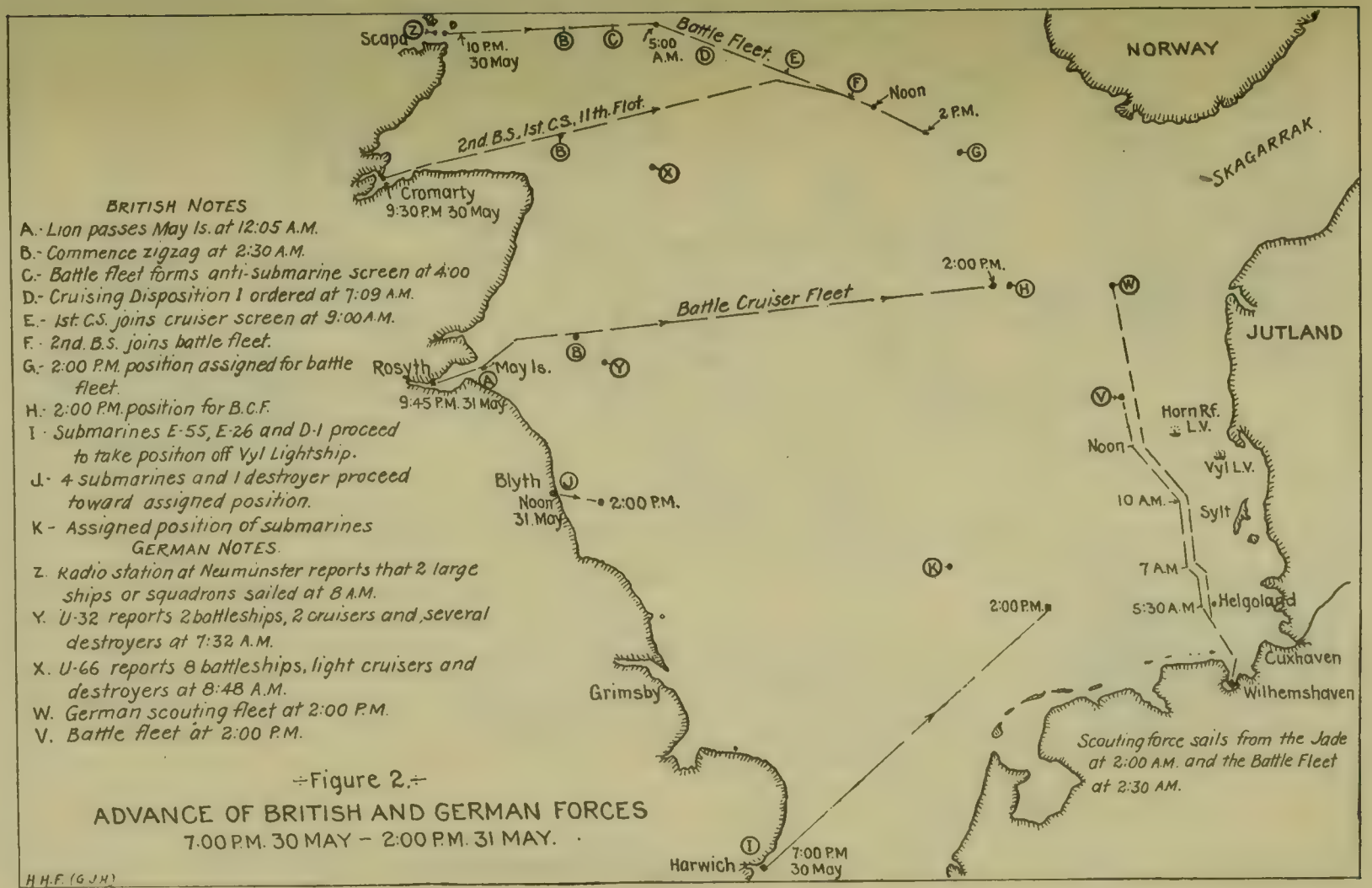

Scapa
10 P.M. 30 May
Battle Fleet
5:00 A.M.
Noon
2 P.M.
2nd B.S., 1st C.S., 11th Flot.
Cromarty
9:30 P.M. 30 May
NORWAY
SKAGARRAK
2:00 P.M.
Battle Cruiser Fleet
Rosyth
May Is.
9:45 P.M. 31 May
JUTLAND
Horn Rf. L.V.
Noon
Vyl L.V.
Blyth
Noon 31 May
2:00 P.M.
10 A.M.
Sylt
7 A.M.
5:30 A.M.
Helgoland
2:00 P.M.
Cuxhaven
Wilhemshaven
Grimsby
Scouting force sails from the Jade at 2:00 A.M. and the Battle Fleet at 2:30 AM.
Harwich
7:00 P.M. 30 May
BRITISH NOTES
A.- Lion passes May Is. at 12:05 A.M.
B.- Commence zigzag at 2:30 A.M.
C.- Battle fleet forms anti-submarine screen at 4:00
D.- Cruising Disposition 1 ordered at 7:09 A.M.
E.- 1st. C.S. joins cruiser screen at 9:00 A.M.
F.- 2nd. B.S. joins battle fleet.
G.- 2:00 P.M. position assigned for battle fleet.
H.- 2:00 P.M. position for B.C.F.
I - Submarines E-55, E-26 and D-1 proceed to take position off Vyl Lightship.
J.- 4 submarines and 1 destroyer proceed toward assigned position.
K - Assigned position of submarines
GERMAN NOTES.
Z. Radio station at Neumünster reports that 2 large ships or squadrons sailed at 8 A.M.
Y. U-32 reports 2 battleships, 2 cruisers and several destroyers at 7:32 A.M.
X. U-66 reports 8 battleships, light cruisers and destroyers at 8:48 A.M.
W. German scouting fleet at 2:00 P.M.
V. Battle fleet at 2:00 P.M.

Figure 2.

ADVANCE OF BRITISH AND GERMAN FORCES
7:00 P.M. 30 MAY – 2:00 P.M. 31 MAY.

H.H.F. (G.J.H.)

A -- Battle Fleet - Jellicoe.
Battleships 24
Battle Cruisers 3
Light Cruisers 12
Cruisers 8
Destroyers 51

B -- Battle Cruiser Fleet - Beatty.
Battleships 4
Battle Cruisers 6
Light Cruisers 14
Destroyers 27
Seaplane Carrier 1

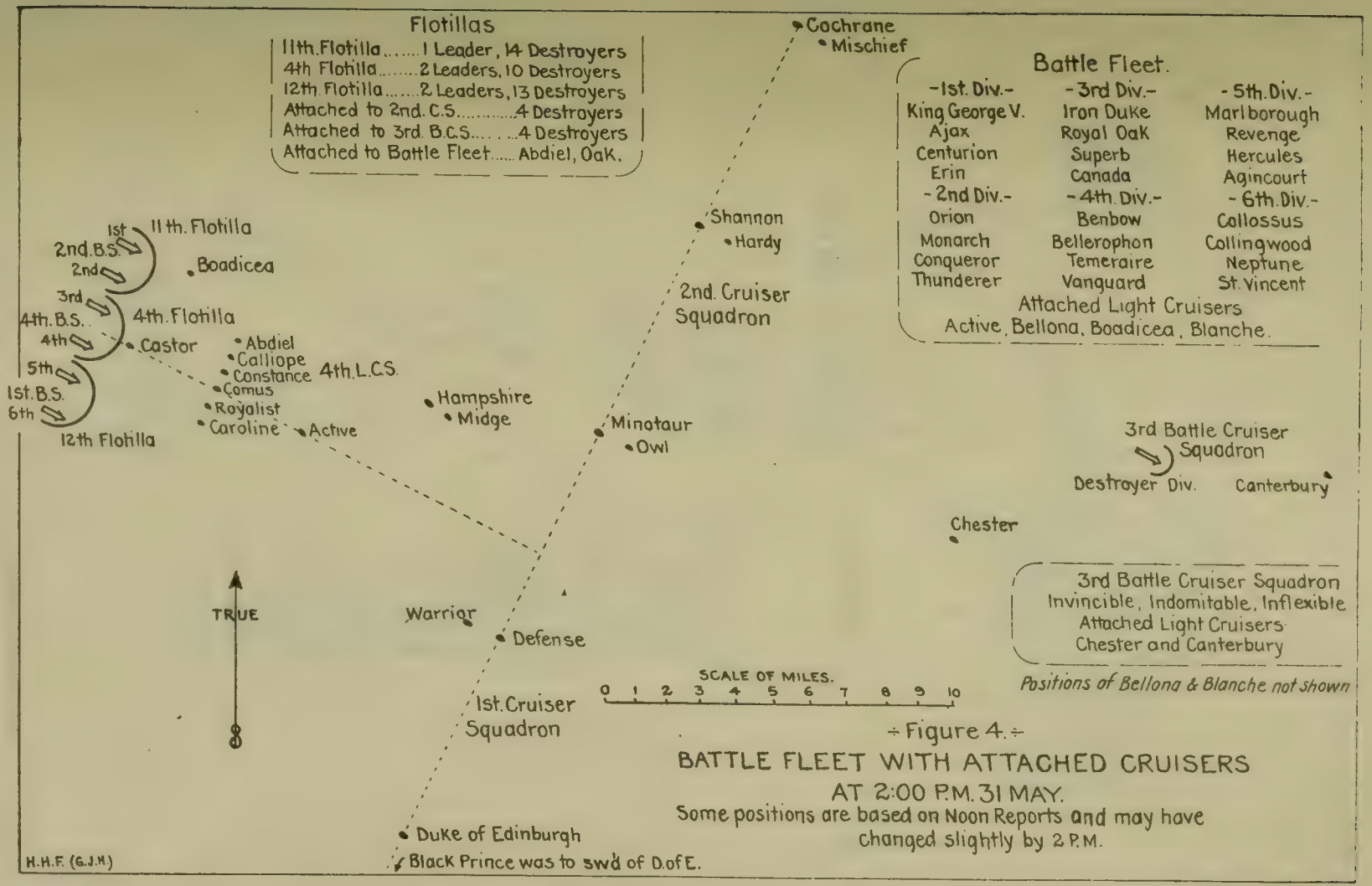
Y -- Battle Fleet - Scheer
Battleships 1st line ... 16
Battleships. 2nd line 6
Light Cruisers 6
Destroyers 33

Z -- Scouting Force - Hipper
Battle Cruisers 5
Light Cruisers 5
Destroyers 32

Figure 3.

GRAND AND HIGH SEA FLEETS
2 P.M. 31 MAY 1916.

H H F (G.J.H.)

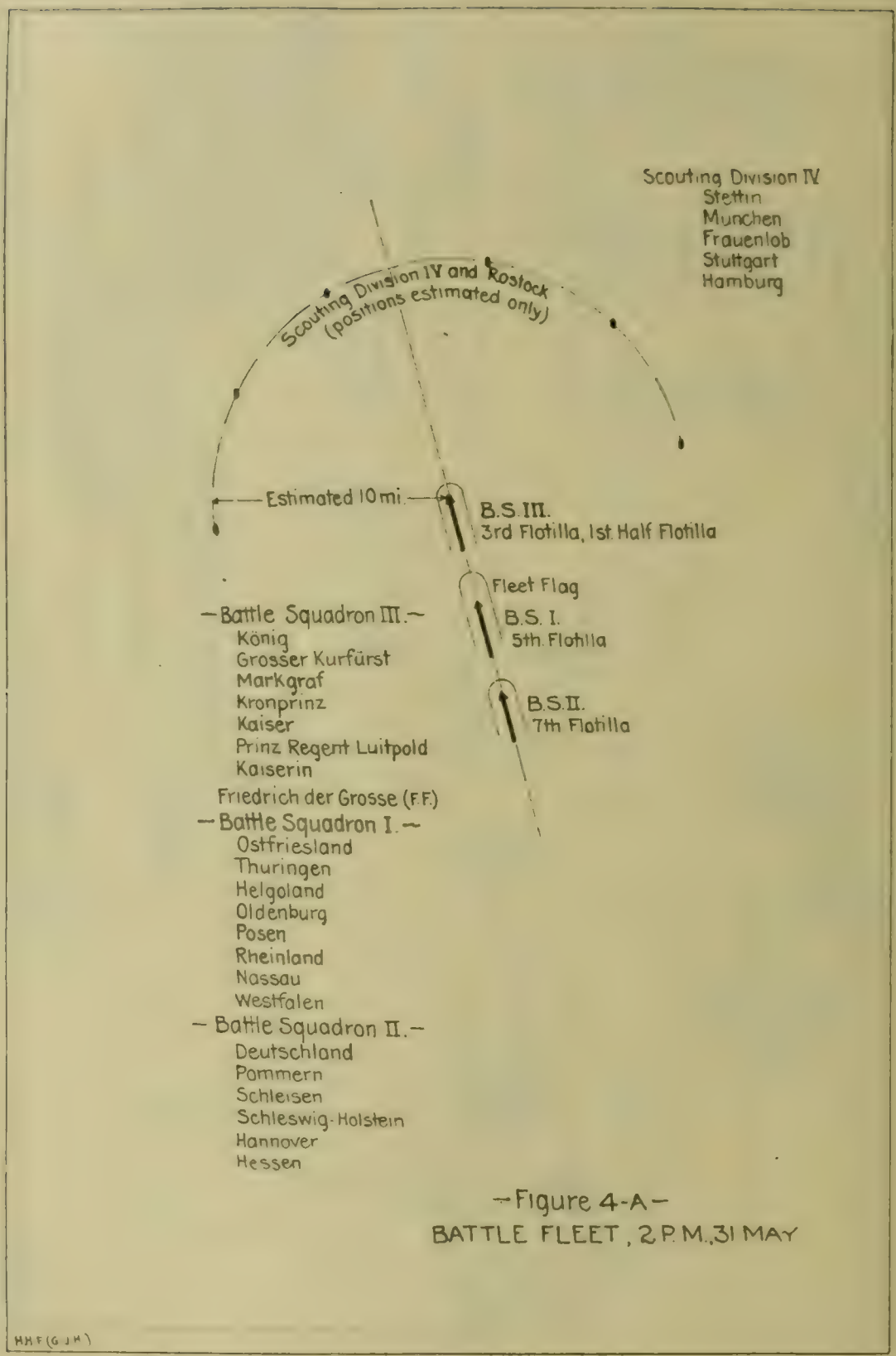


÷ Figure 4. ÷

BATTLE FLEET WITH ATTACHED CRUISERS

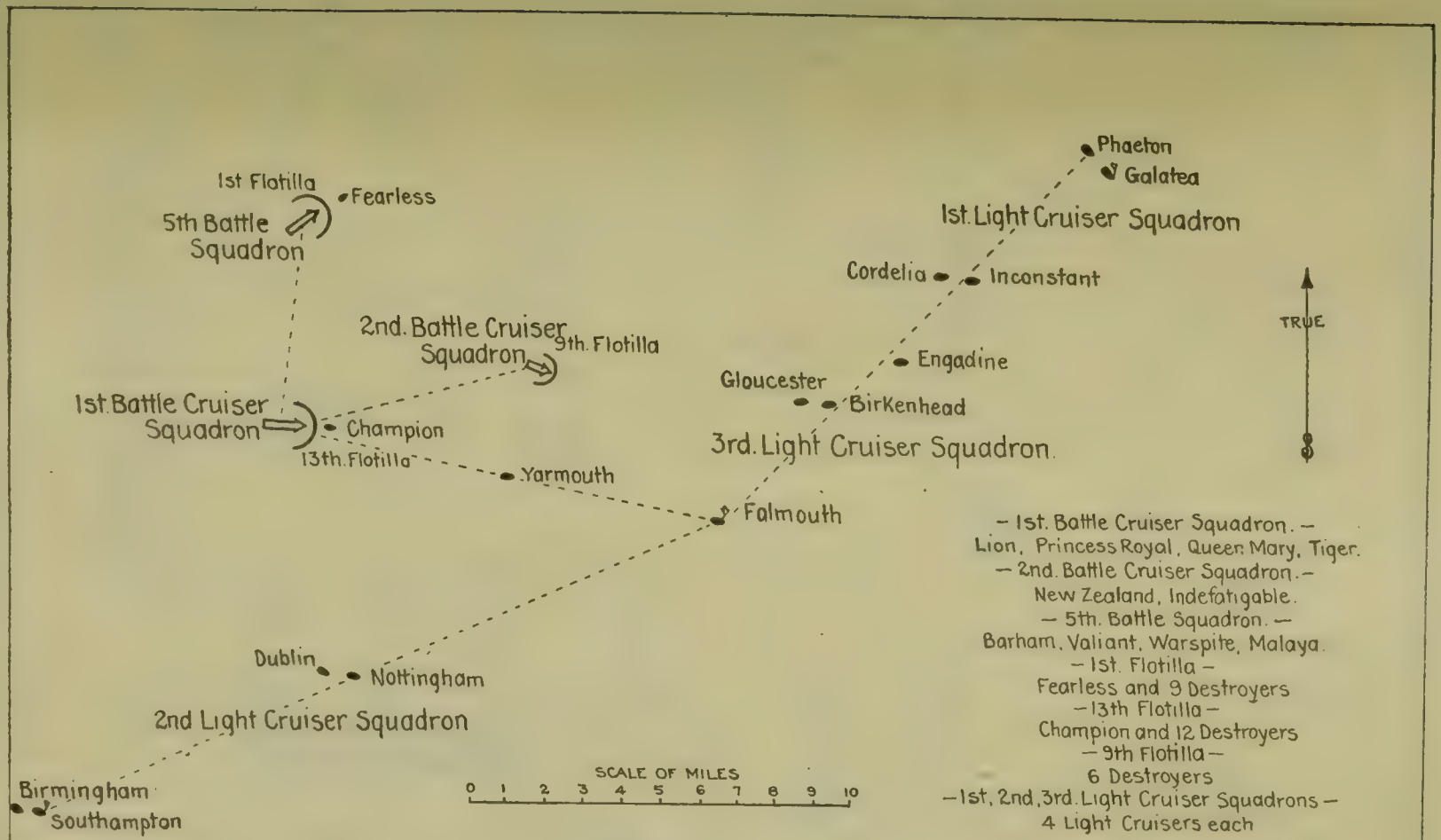
AT 2:00 P.M. 31 MAY.

Some positions are based on Noon Reports and may have changed slightly by 2 P.M.



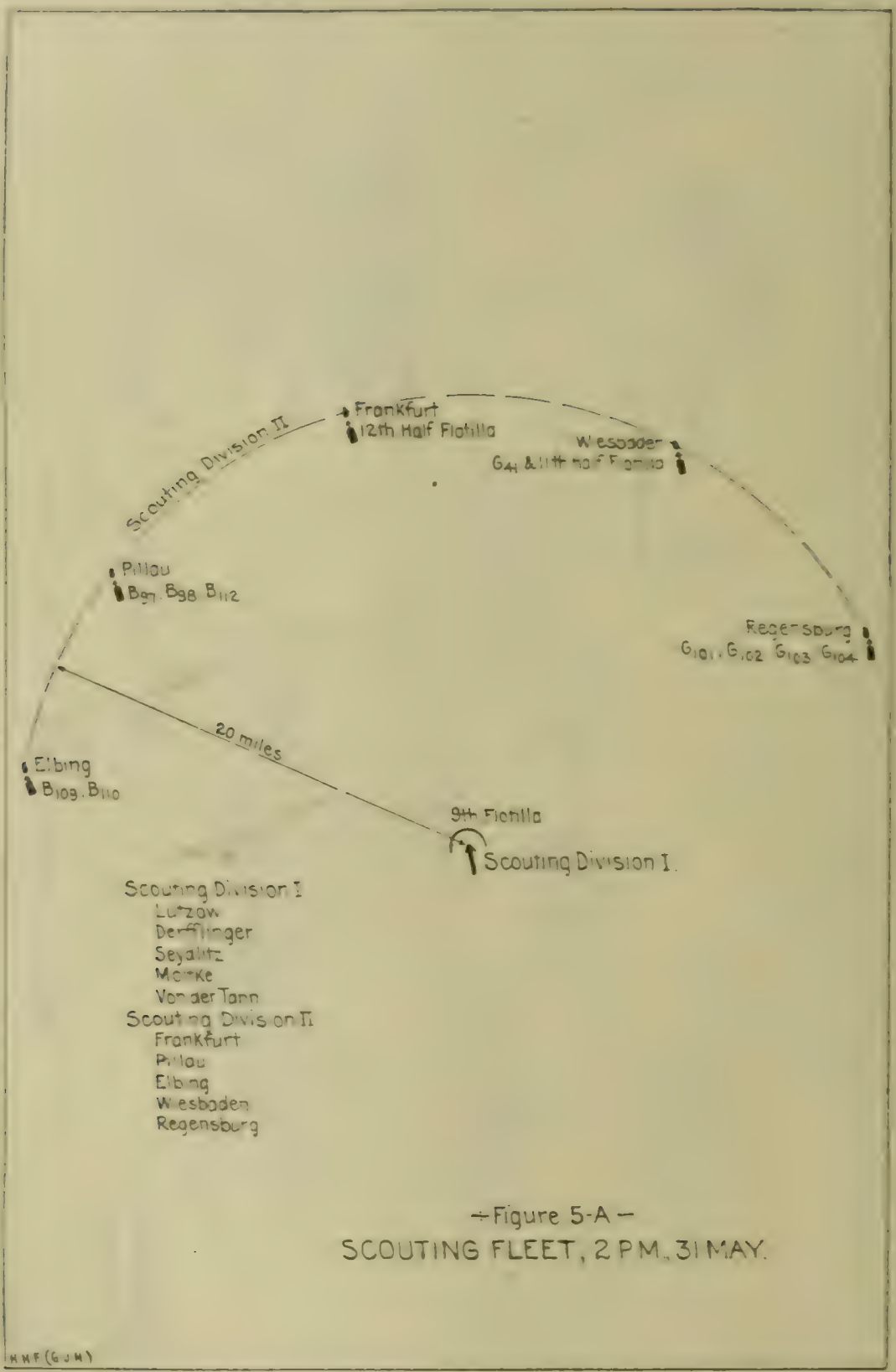
— Figure 4-A —
BATTLE FLEET, 2 P.M., 31 MAY

HHF(GJH)



÷ Figure 5. ÷

BATTLE CRUISER FLEET AT 2 P.M. 31 MAY.



— Figure 5-A —

SCOUTING FLEET, 2 P.M., 31 MAY.

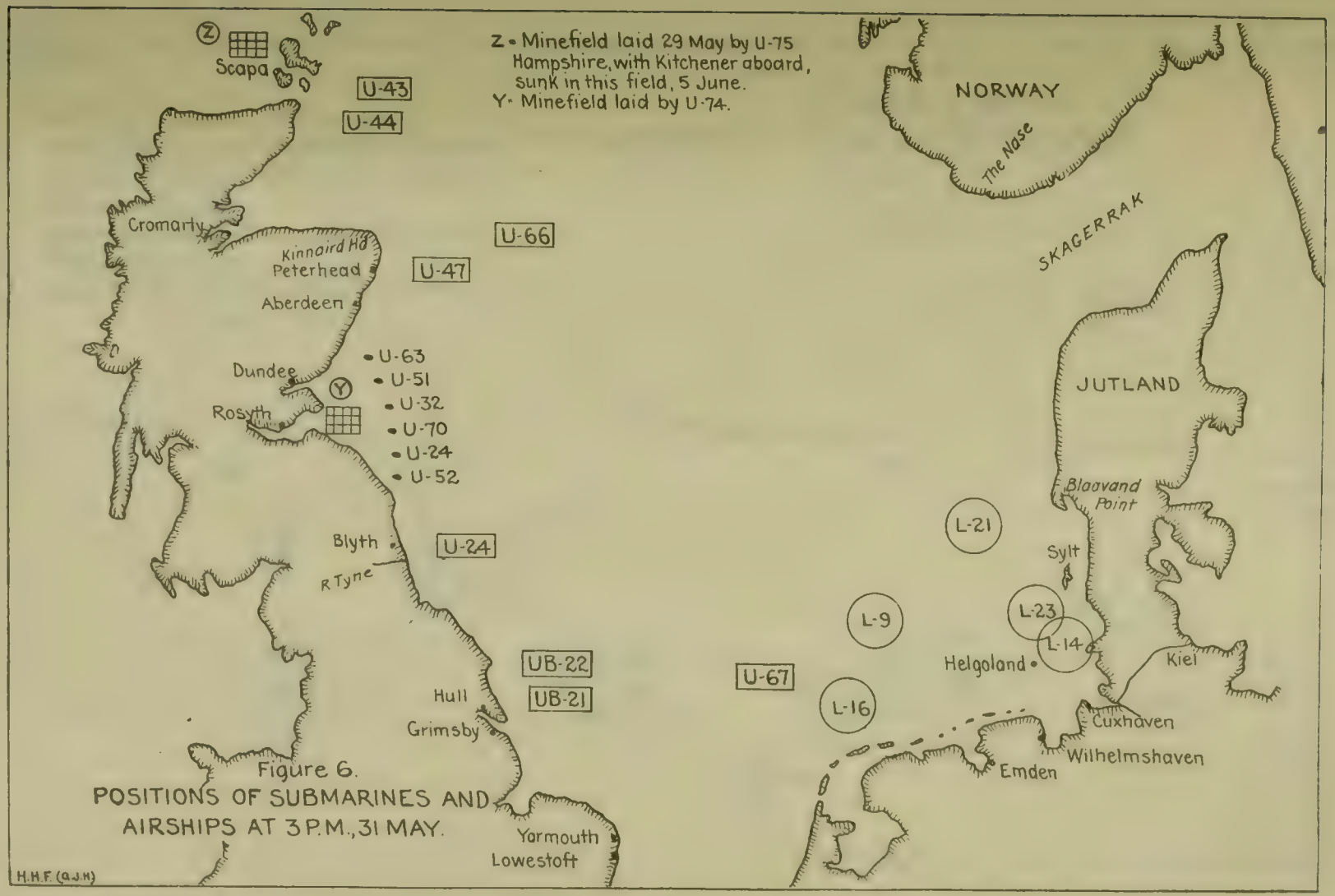
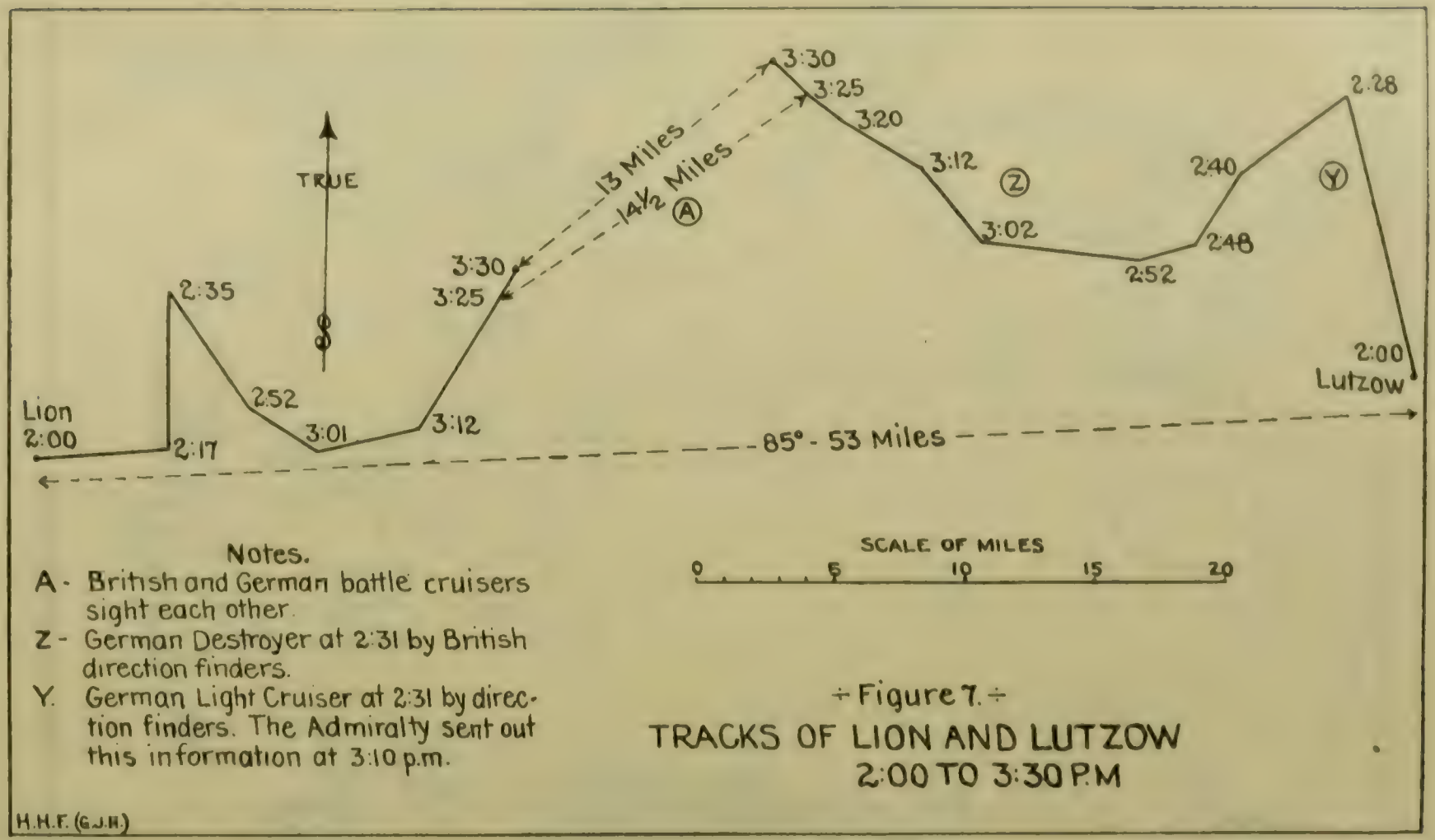
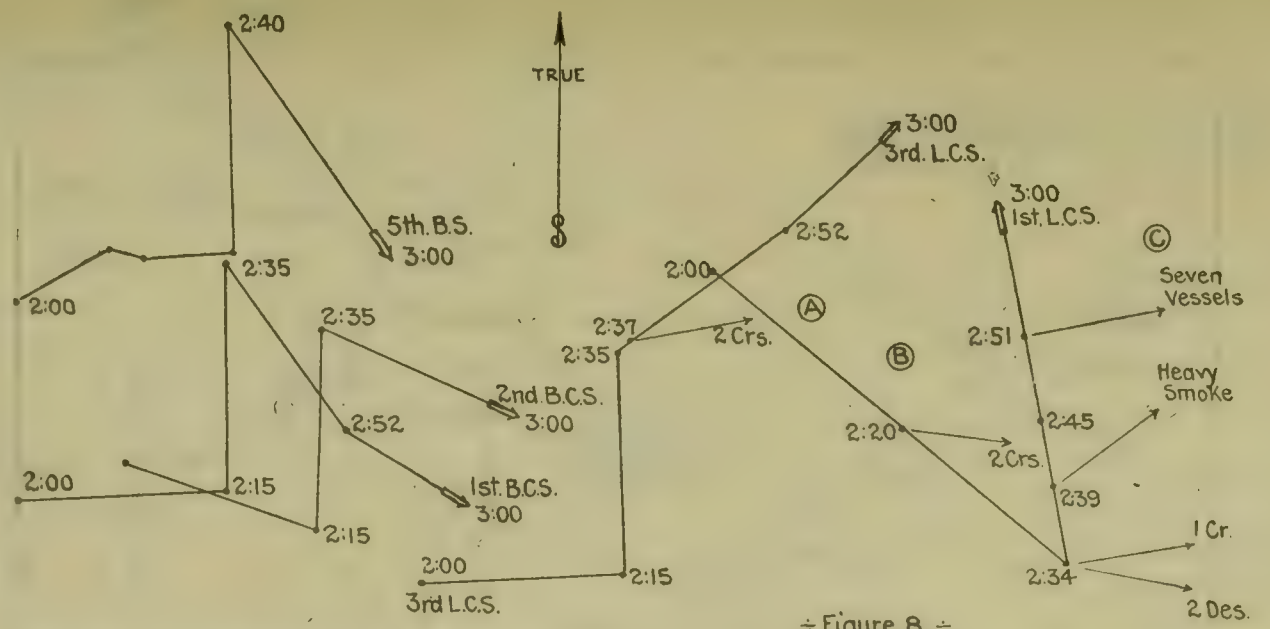


Figure 6.
POSITIONS OF SUBMARINES AND AIRSHIPS AT 3 P.M., 31 MAY.



÷ Figure 7. ÷

TRACKS OF LION AND LUTZOW
2:00 TO 3:30 P.M



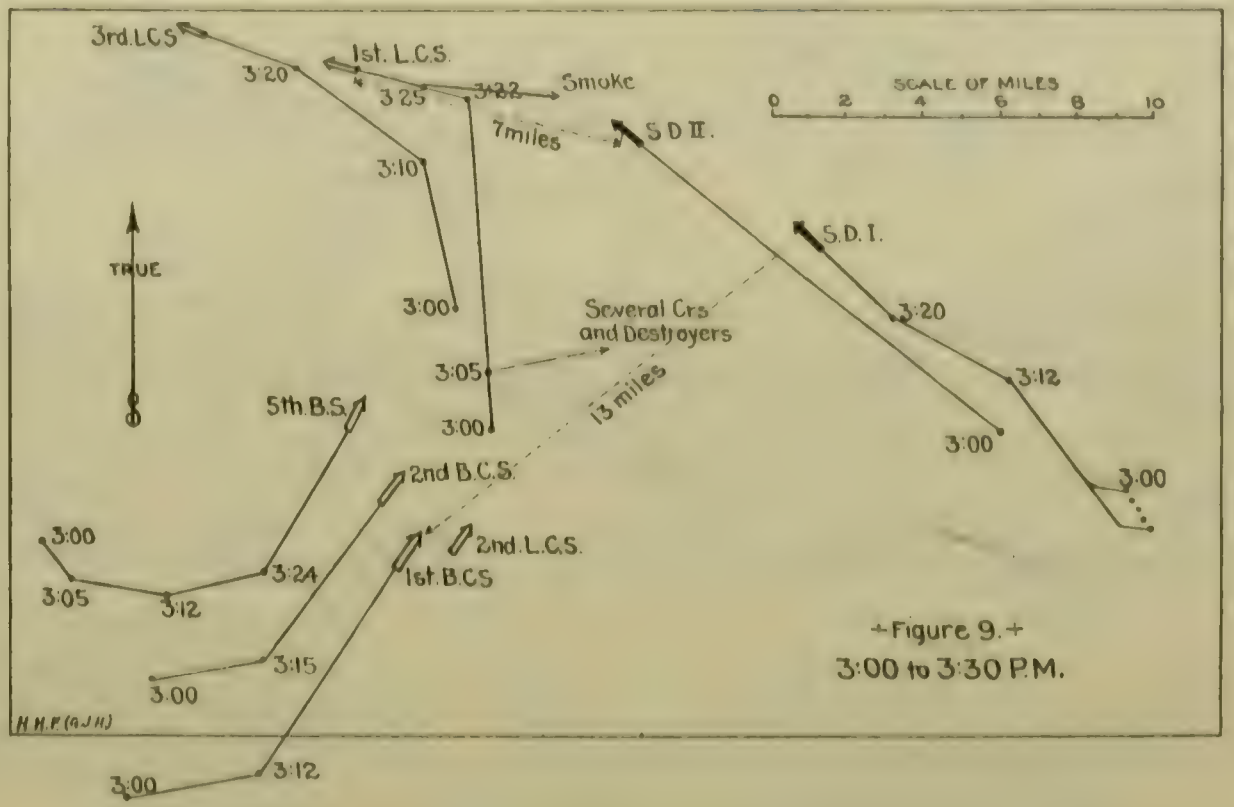
Note: 2nd. L.C.S. is omitted from this sketch.
Arrows show bearings of German Forces as reported.
Reported positions of Galatea –
A - 2:34; B - 2:39; C - 2:51.

÷ Figure 8. ÷

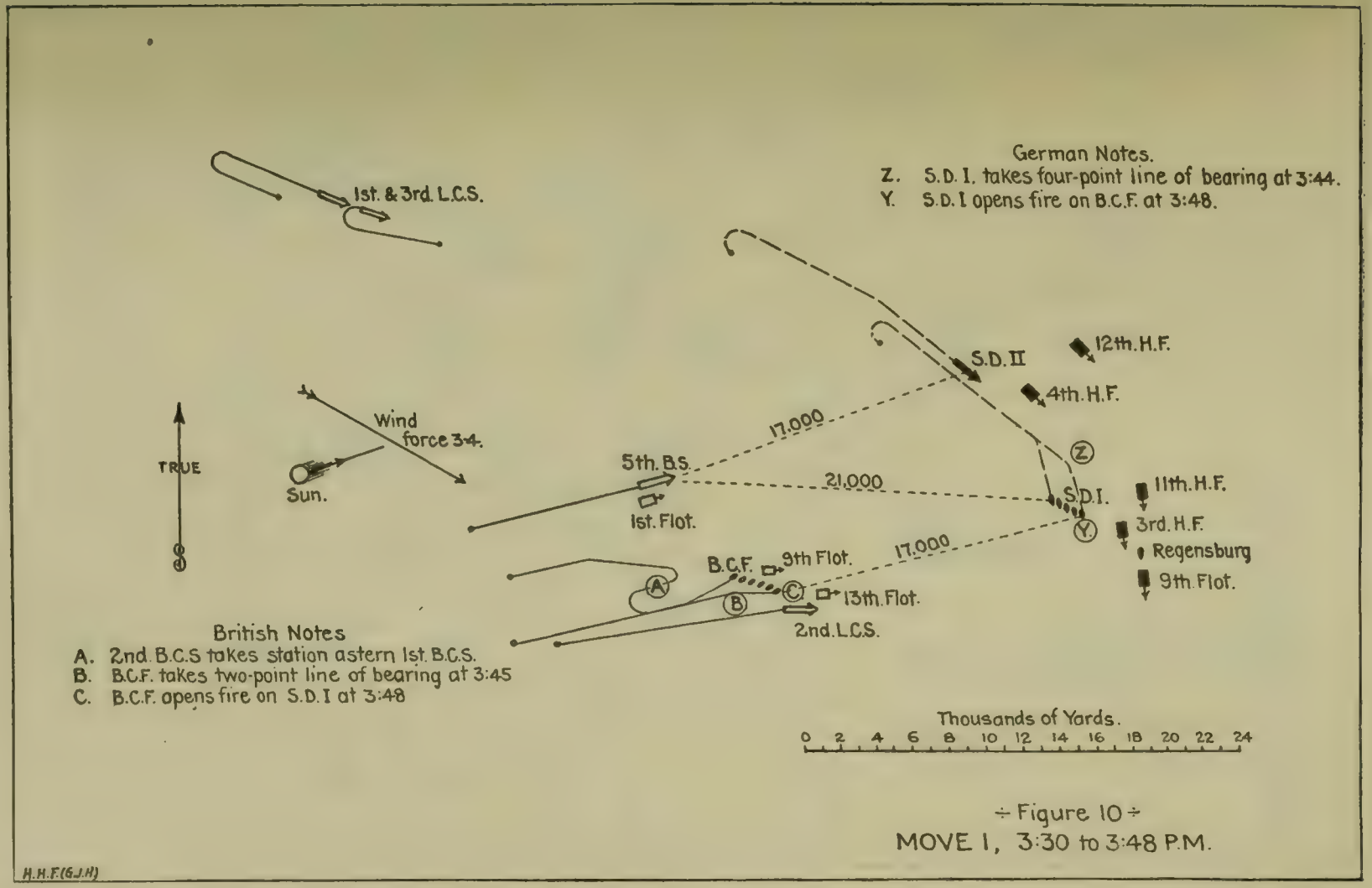
DEPLOYMENT OF THE BATTLE CRUISER FLEET 2:00 TO 3:00 P.M.

SCALE OF MILES.
0 2 4 6 8 10

H H F (G.J.H)

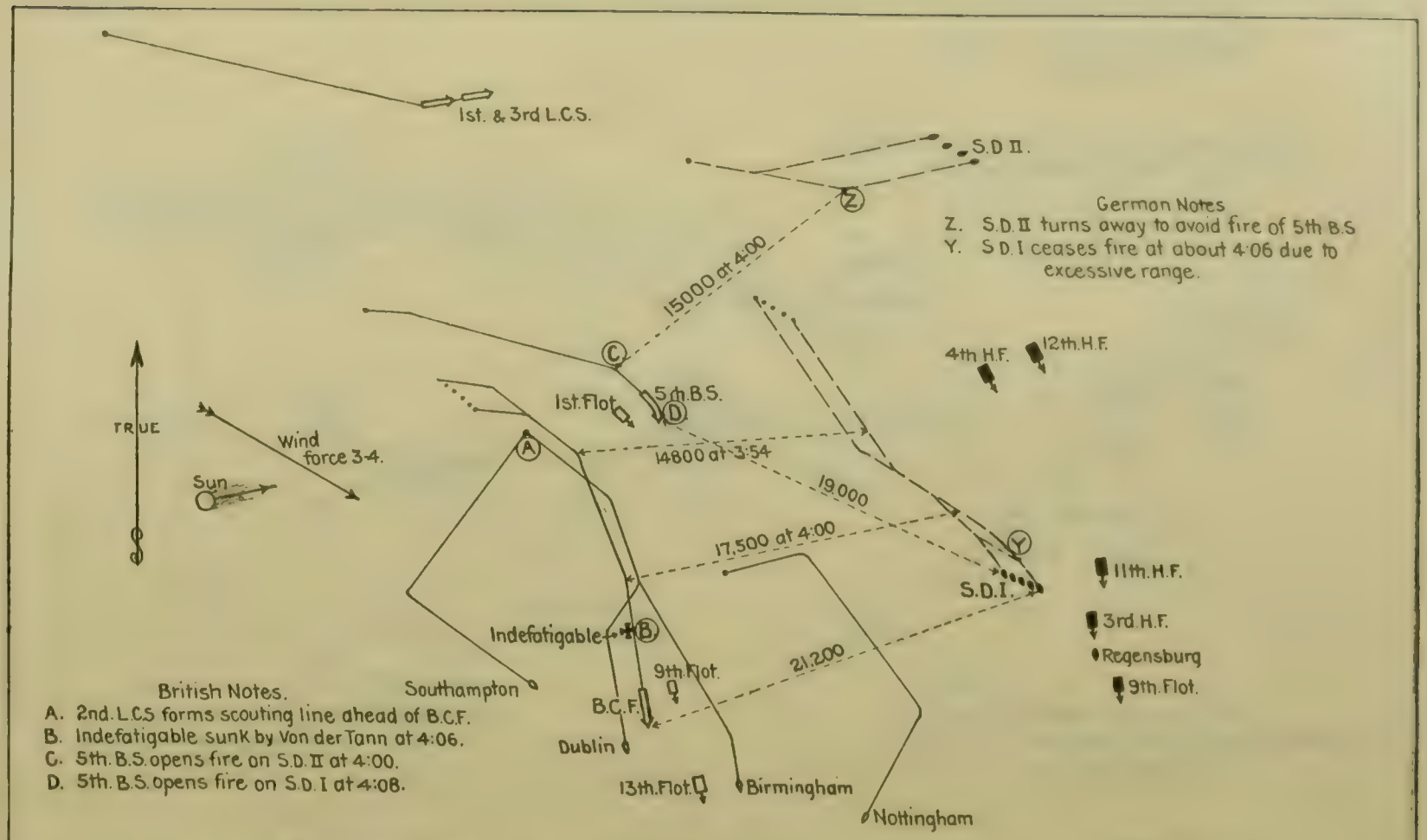


+Figure 9.+
3:00 to 3:30 P.M.



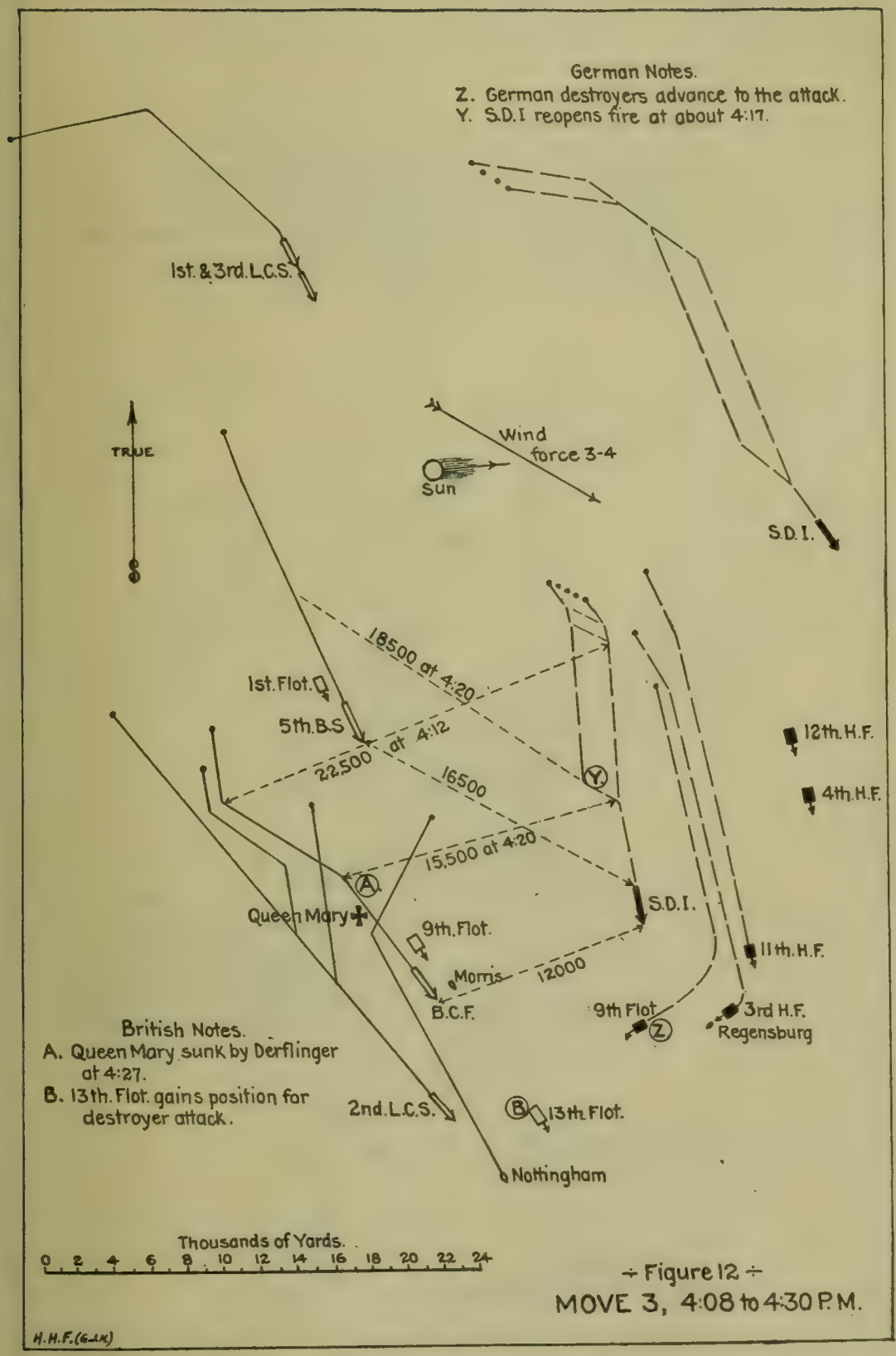
÷ Figure 10 ÷

MOVE 1, 3:30 to 3:48 P.M.



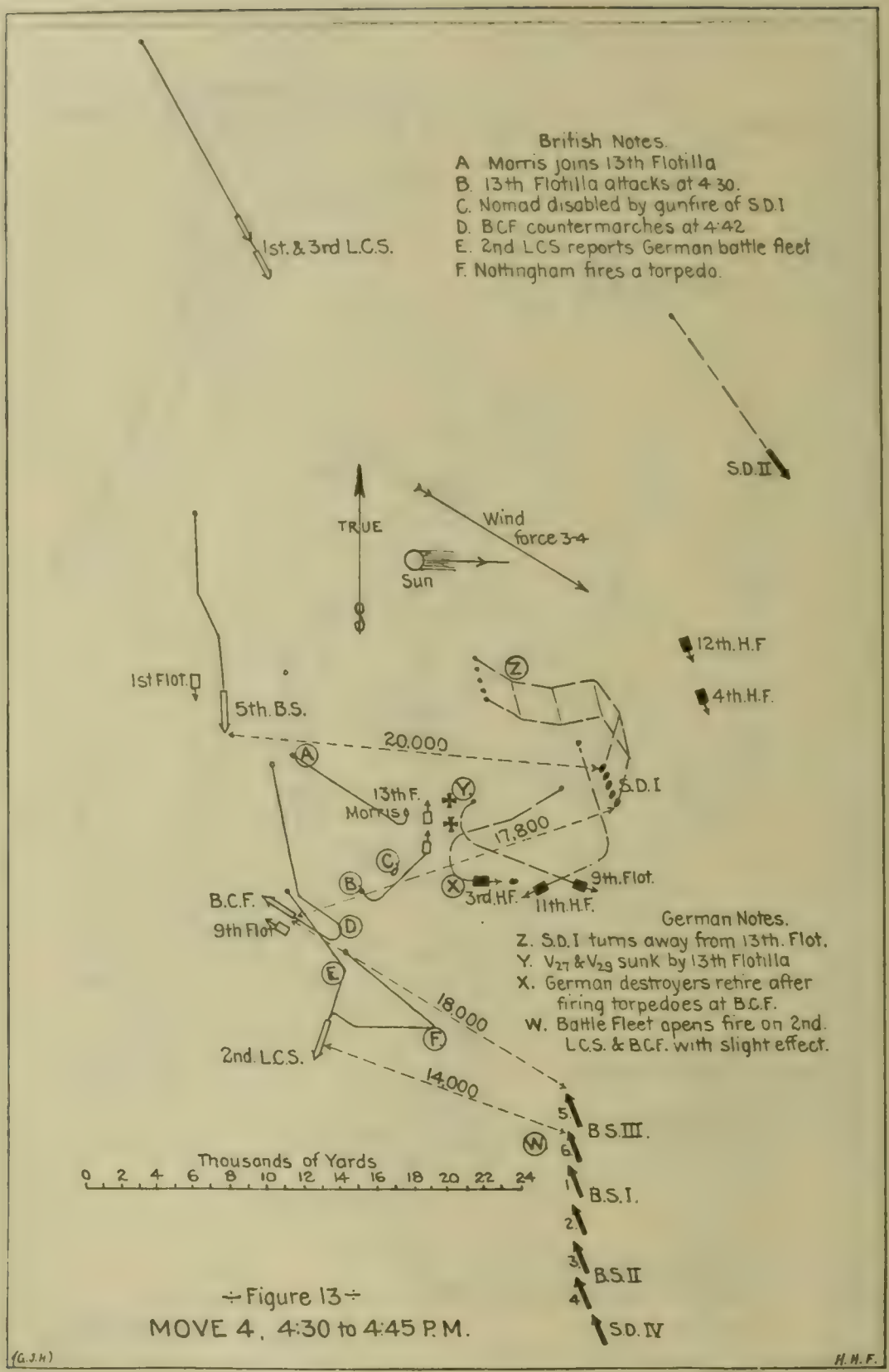
÷ Figure 11.÷

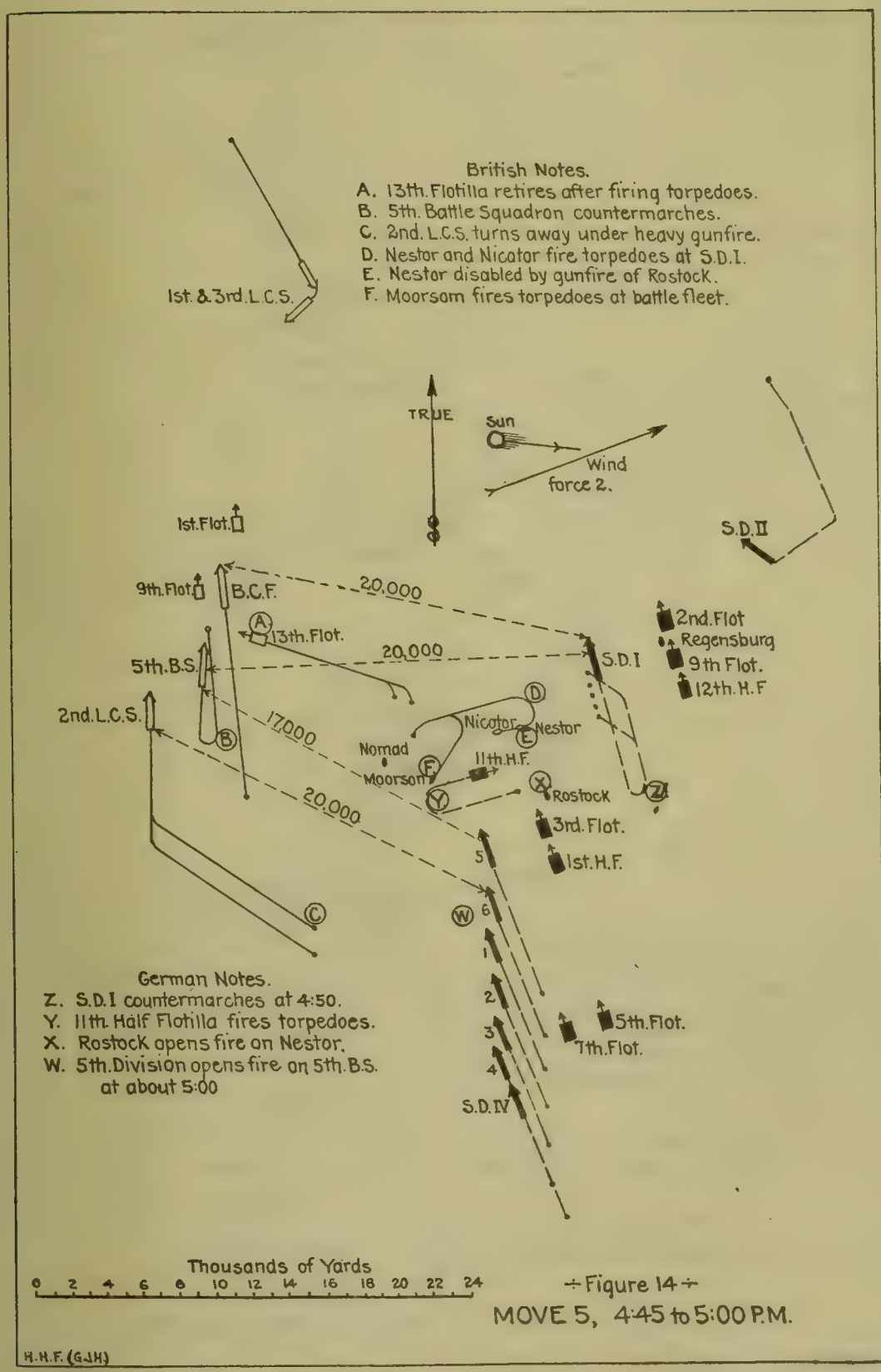
MOVE 2, 3:48 to 4:08 P.M.



÷ Figure 12 ÷

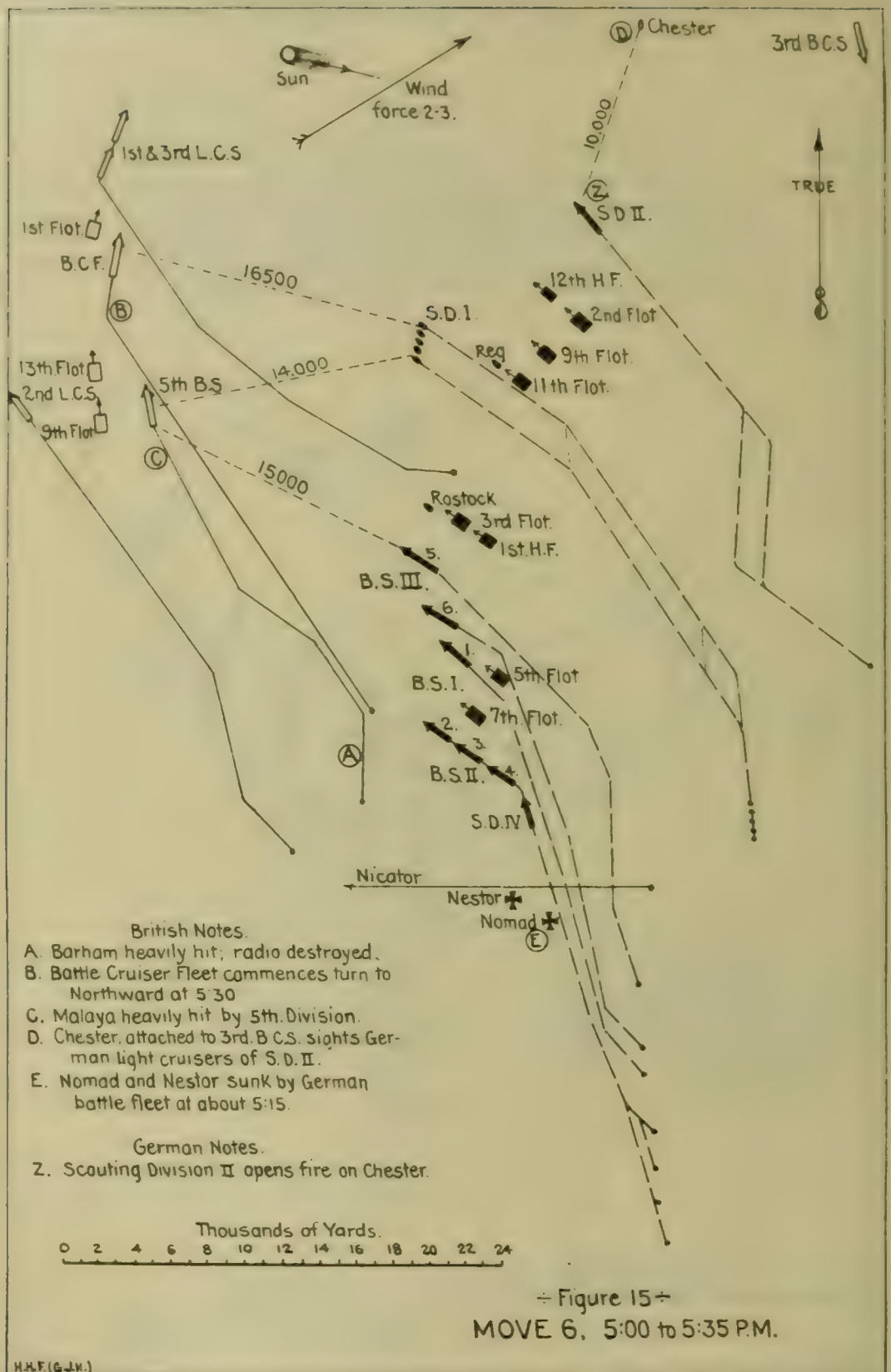
MOVE 3, 4:08 to 4:30 P.M.


British Notes.
A Morris joins 13th Flotilla
B. 13th Flotilla attacks at 4.30.
C. Nomad disabled by gunfire of S.D.I
D. B.C.F countermarches at 4.42
E. 2nd LCS reports German battle fleet
F. Nottingham fires a torpedo.
1st. & 3rd L.C.S.
S.D.II
TRUE
Wind force 3-4
Sun
12th. H.F
4th. H.F.
1st Flot.
5th. B.S.
20,000
13th F.
Morris
17,800
S.D.I
9th. Flot.
3rd. H.F.
11th. H.F.
B.C.F.
9th Flot
18,000
2nd. L.C.S.
14,000
German Notes.
Z. S.D.I turns away from 13th. Flot.
Y. V27 & V29 sunk by 13th Flotilla
X. German destroyers retire after firing torpedoes at B.C.F.
W. Battle Fleet opens fire on 2nd. L.C.S. & B.C.F. with slight effect.
Thousands of Yards
0 2 4 6 8 10 12 14 16 18 20 22 24
B.S.III.
B.S.I.
B.S.II
S.D.IV
÷Figure 13÷
MOVE 4, 4:30 to 4:45 P.M.
(G.J.H)
H.H.F.



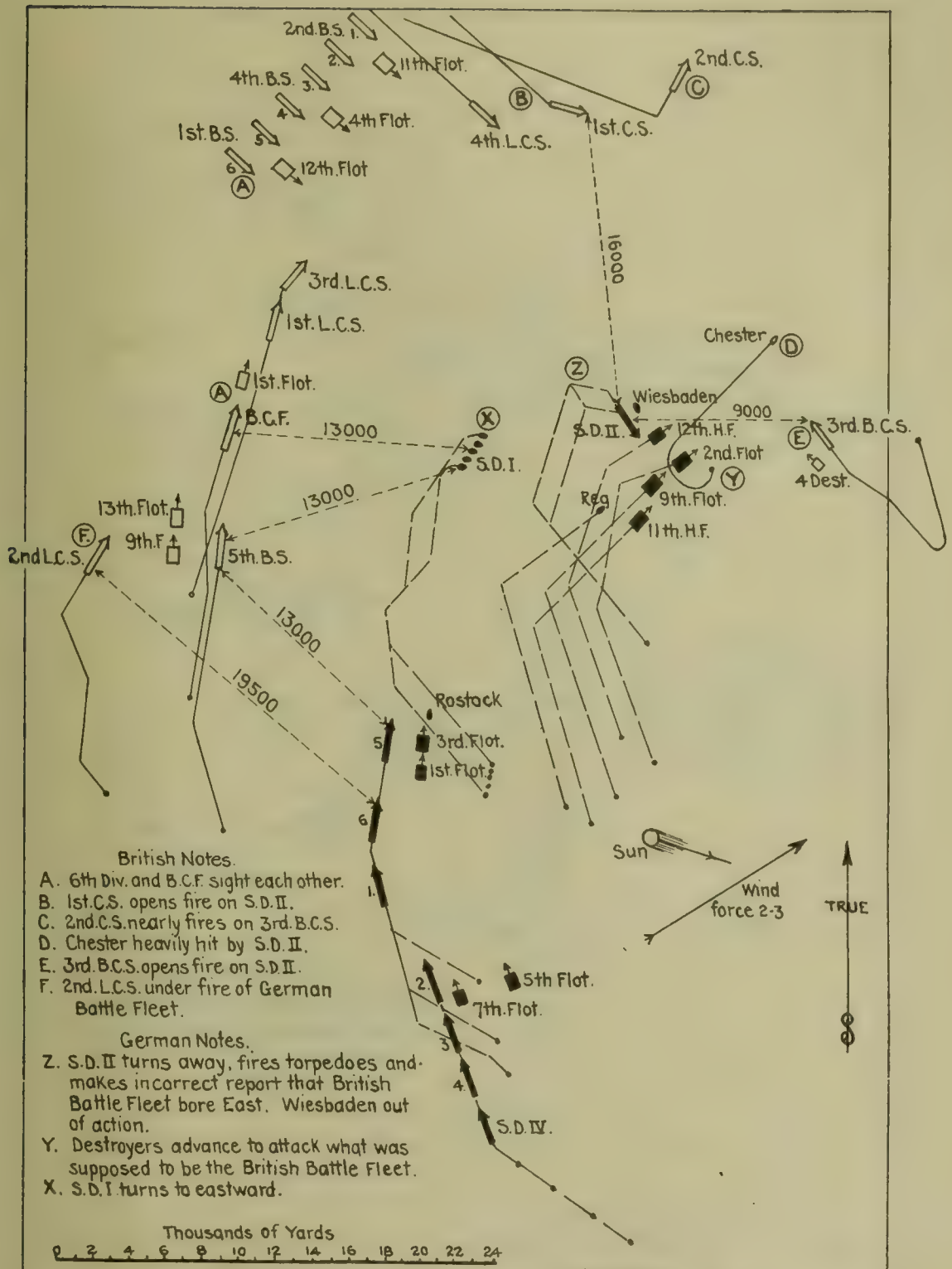
÷Figure 14÷

MOVE 5, 4:45 to 5:00 P.M.



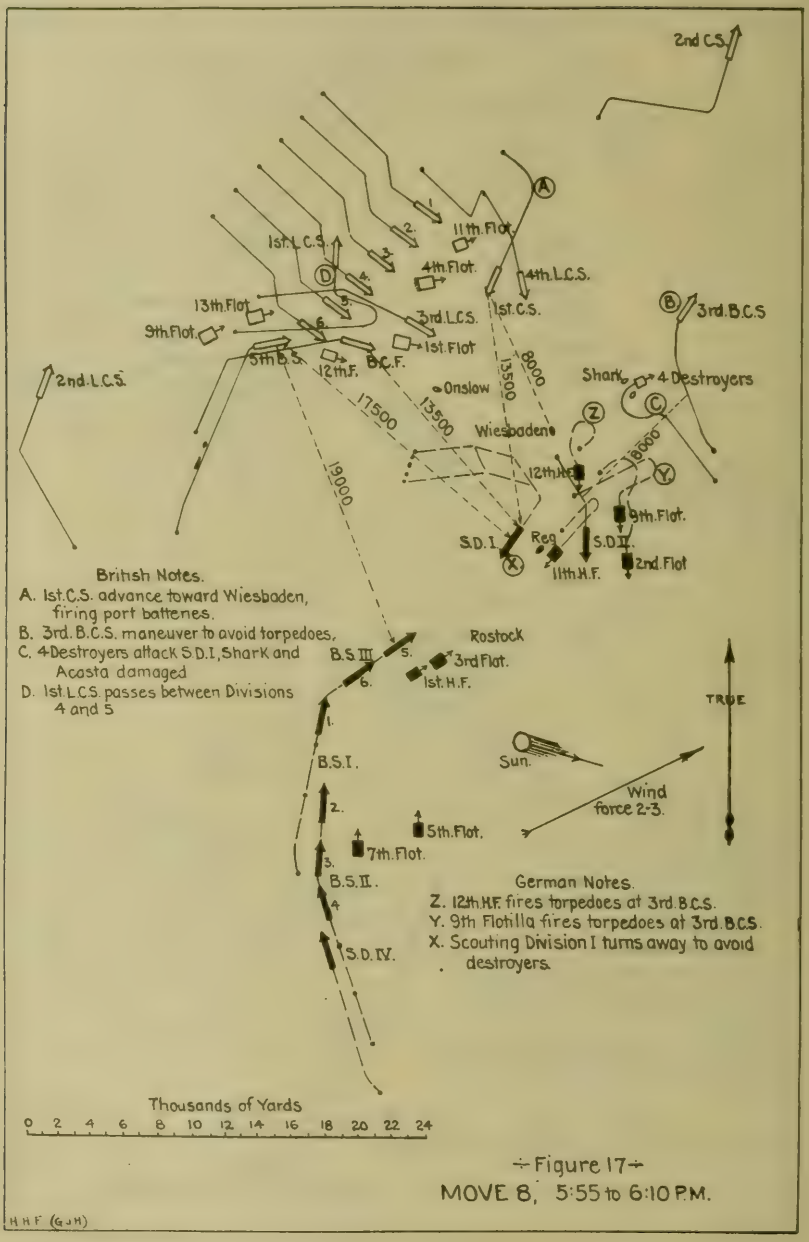
÷ Figure 15 ÷

MOVE 6, 5:00 to 5:35 P.M.



÷ Figure 16. ÷

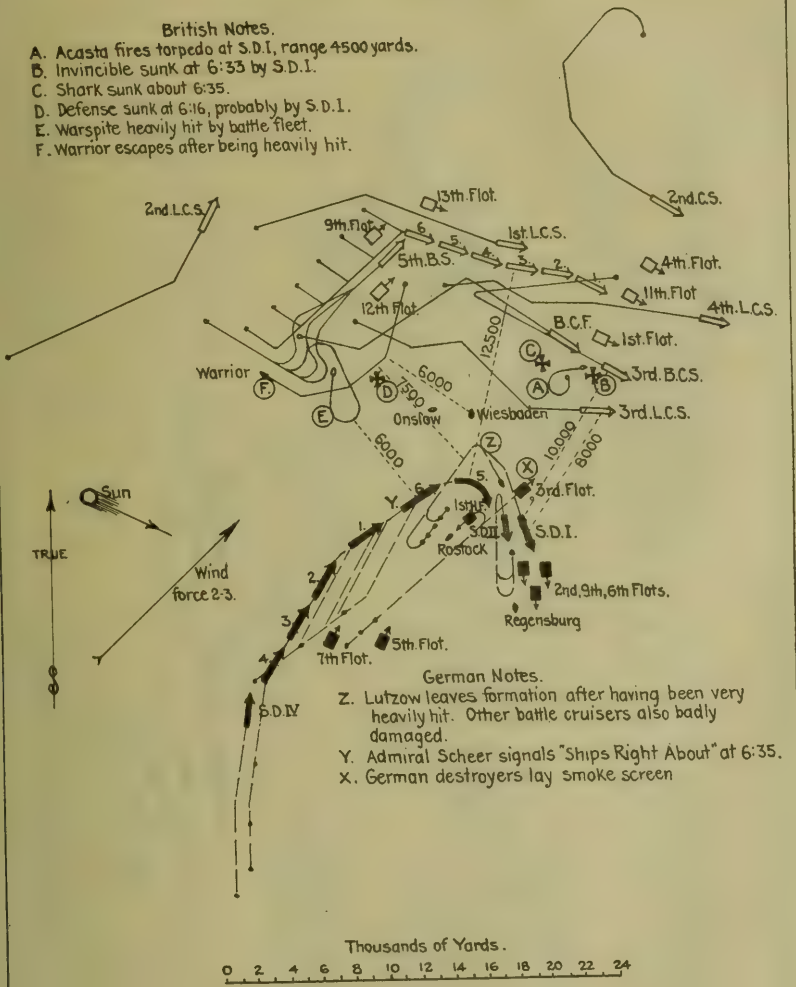
MOVE 7, 5:35 to 5:55 P.M.



÷Figure 17÷

MOVE 8, 5:55 to 6:10 P.M.

H.H.F (G.J.H)



÷Figure 18÷
MOVE 9, 6:10 to 6:35 P.M.

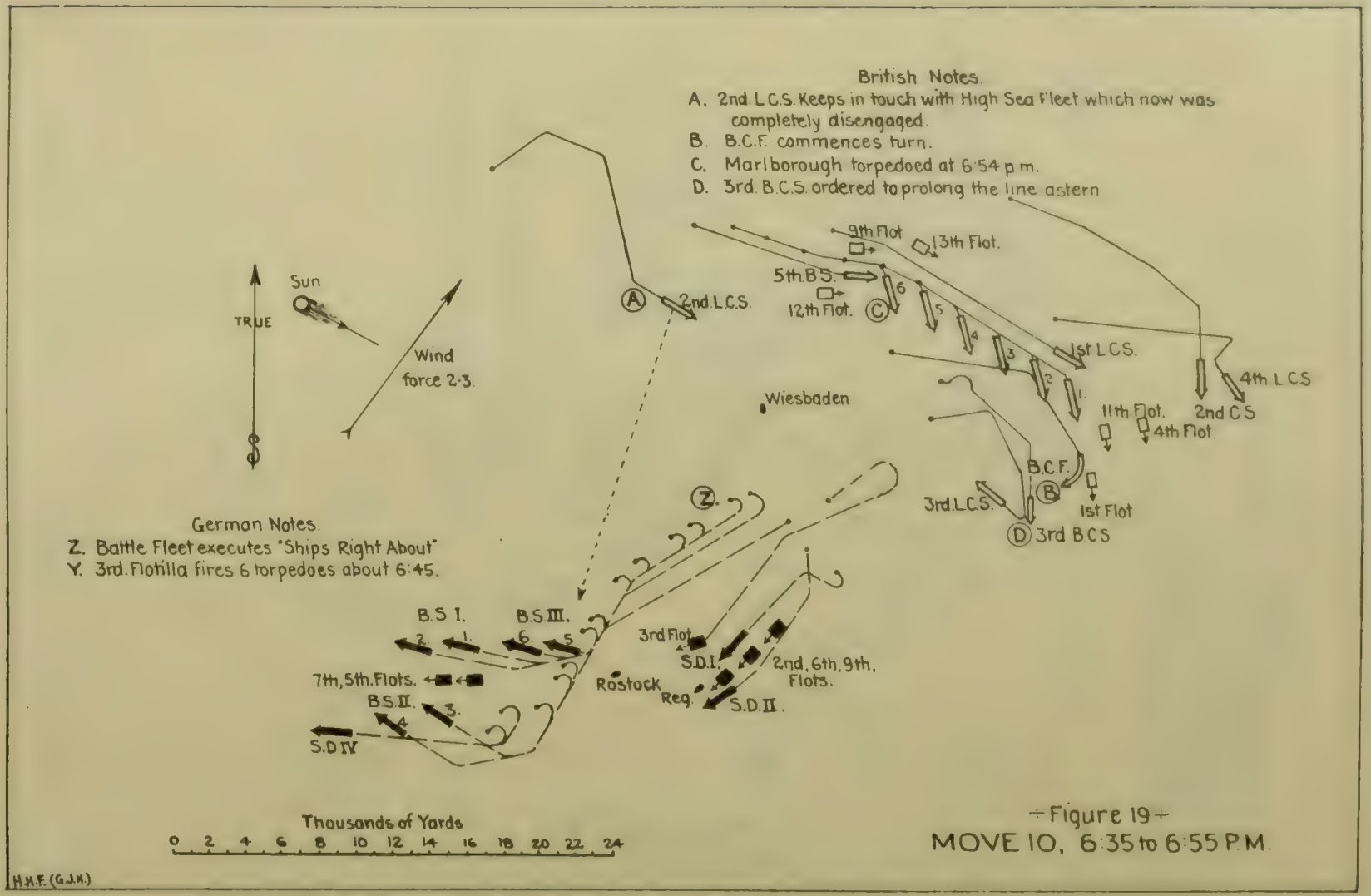
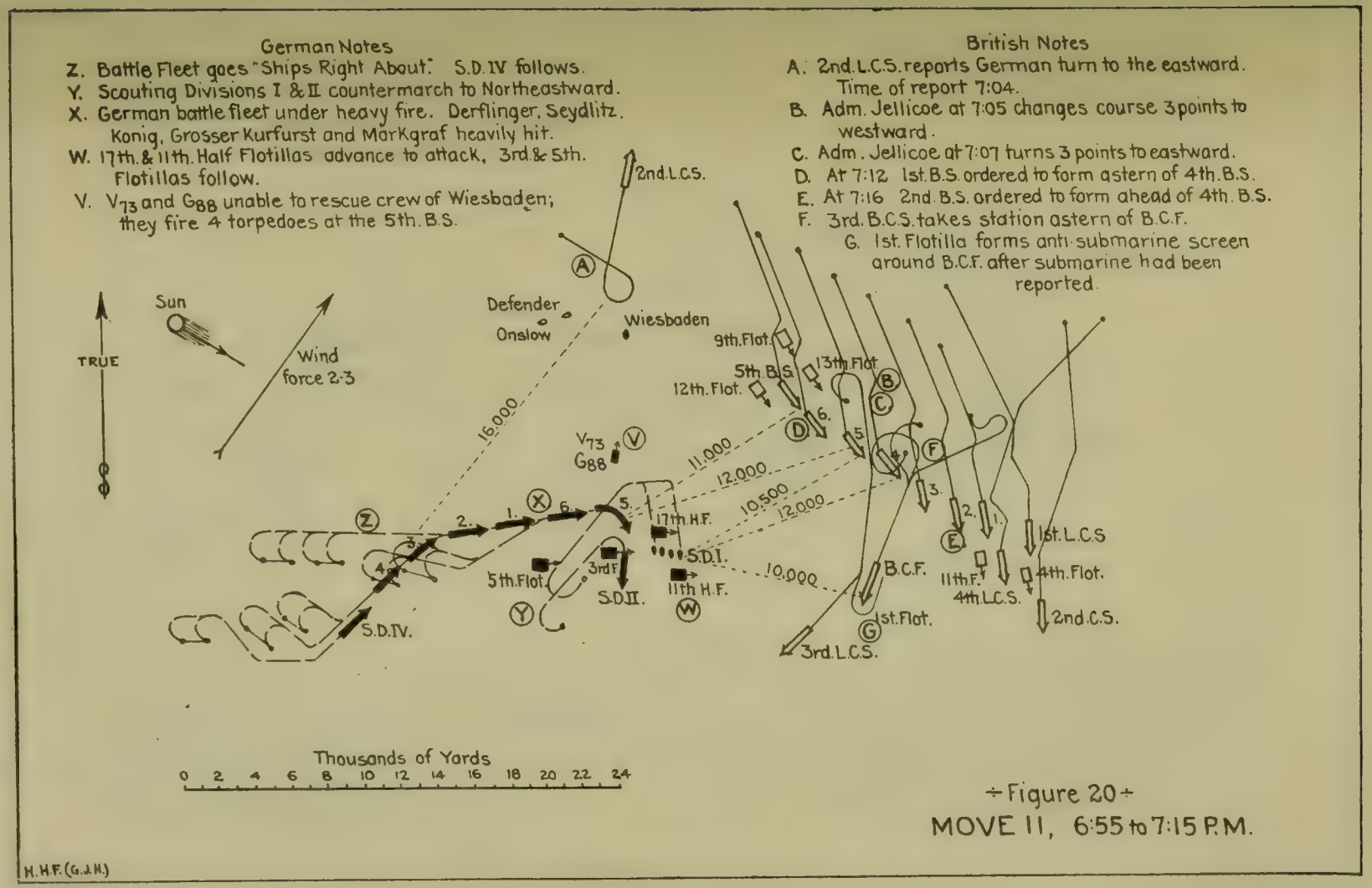


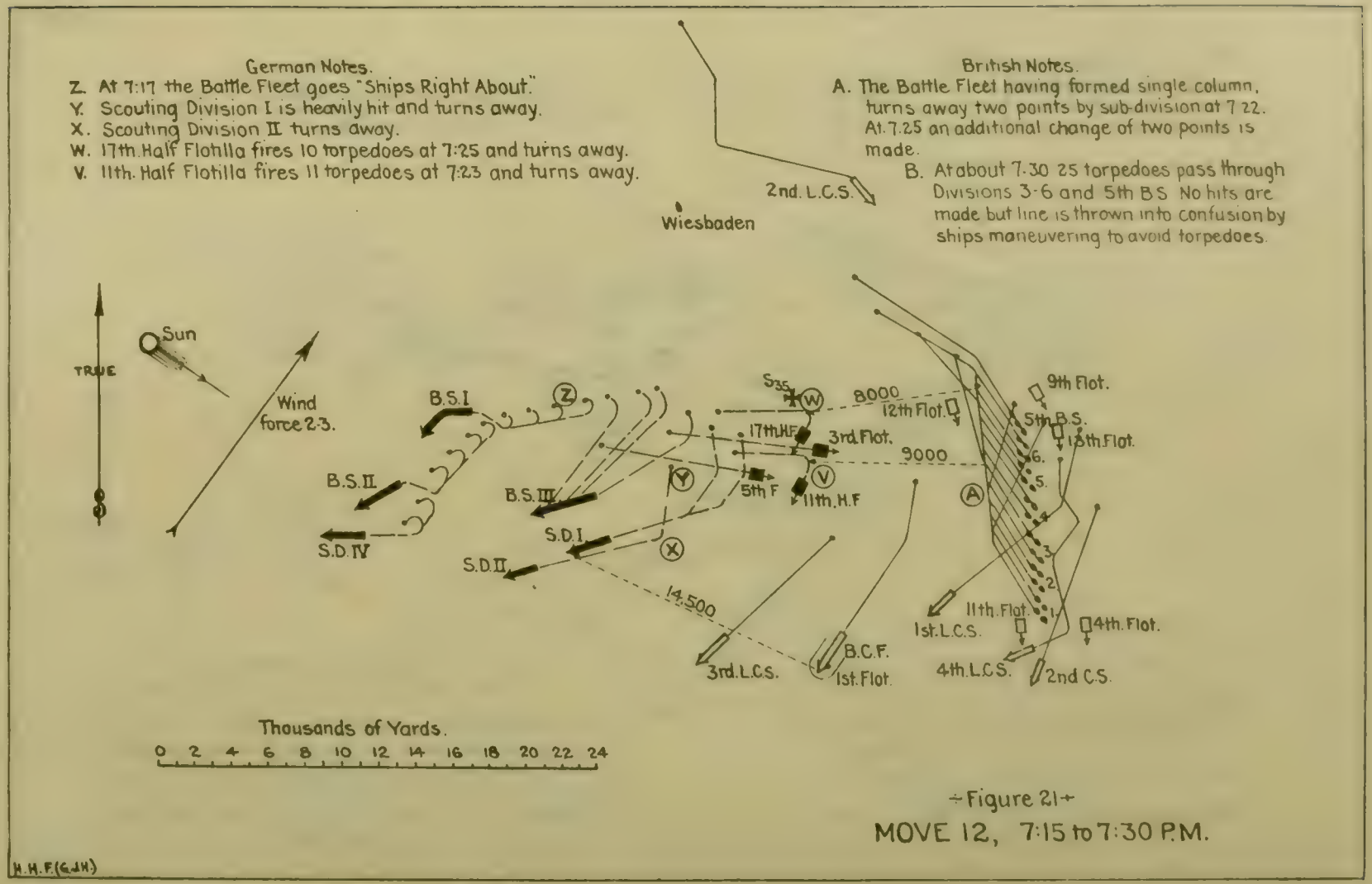
Figure 19
MOVE 10, 6:35 to 6:55 P.M.


German Notes
Z. Battle Fleet goes "Ships Right About." S.D.IV follows.
Y. Scouting Divisions I & II countermarch to Northeastward.
X. German battle fleet under heavy fire. Derflinger, Seydlitz, Konig, Grosser Kurfurst and Markgraf heavily hit.
W. 17th. & 11th. Half Flotillas advance to attack, 3rd. & 5th. Flotillas follow.
V. V73 and G88 unable to rescue crew of Wiesbaden; they fire 4 torpedoes at the 5th. B.S.
British Notes
A. 2nd. L.C.S. reports German turn to the eastward. Time of report 7:04.
B. Adm. Jellicoe at 7:05 changes course 3 points to westward.
C. Adm. Jellicoe at 7:07 turns 3 points to eastward.
D. At 7:12 1st. B.S. ordered to form astern of 4th. B.S.
E. At 7:16 2nd. B.S. ordered to form ahead of 4th. B.S.
F. 3rd. B.C.S. takes station astern of B.C.F.
G. 1st. Flotilla forms anti-submarine screen around B.C.F. after submarine had been reported.
TRUE
Sun
Wind force 2-3
Defender
Onslow
Wiesbaden
2nd.L.C.S.
9th.Flot.
5th.B.S.
12th.Flot.
13th.Flot.
V73
G88
16,000
11,000
12,000
10,500
12,000
10,000
17th.H.F.
S.D.I.
11th H.F.
3rdF.
5th.Flot.
S.D.II.
S.D.IV.
B.C.F.
1st.Flot.
3rd.L.C.S.
11th.F.
4th.LC.S.
1st.L.C.S
4th.Flot.
2nd.C.S.
Thousands of Yards
0 2 4 6 8 10 12 14 16 18 20 22 24

H.H.F. (G.J.H.)

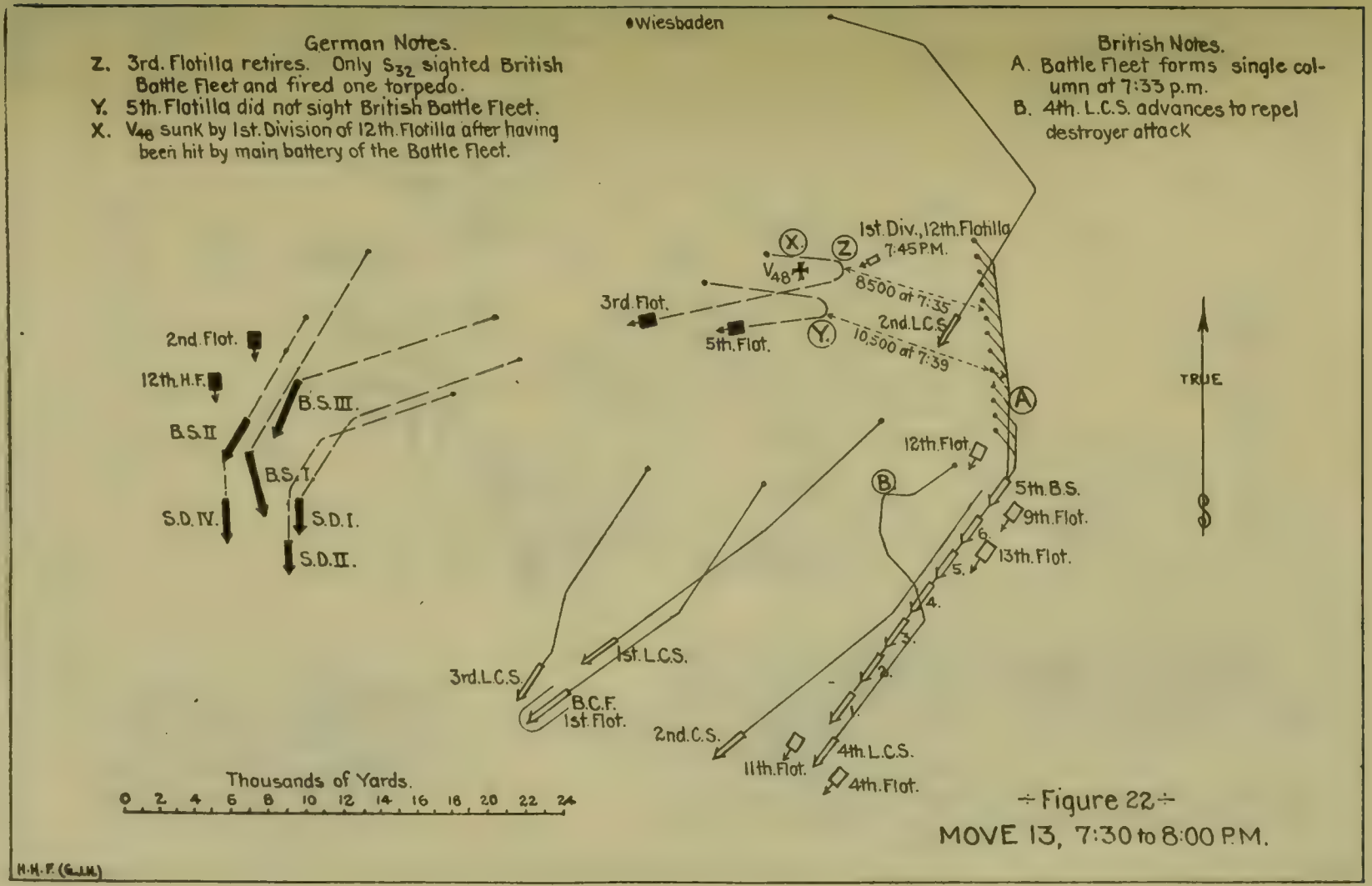
÷Figure 20÷

MOVE 11, 6:55 to 7:15 P.M.



÷Figure 21÷

MOVE 12, 7:15 to 7:30 P.M.



÷ Figure 22 ÷

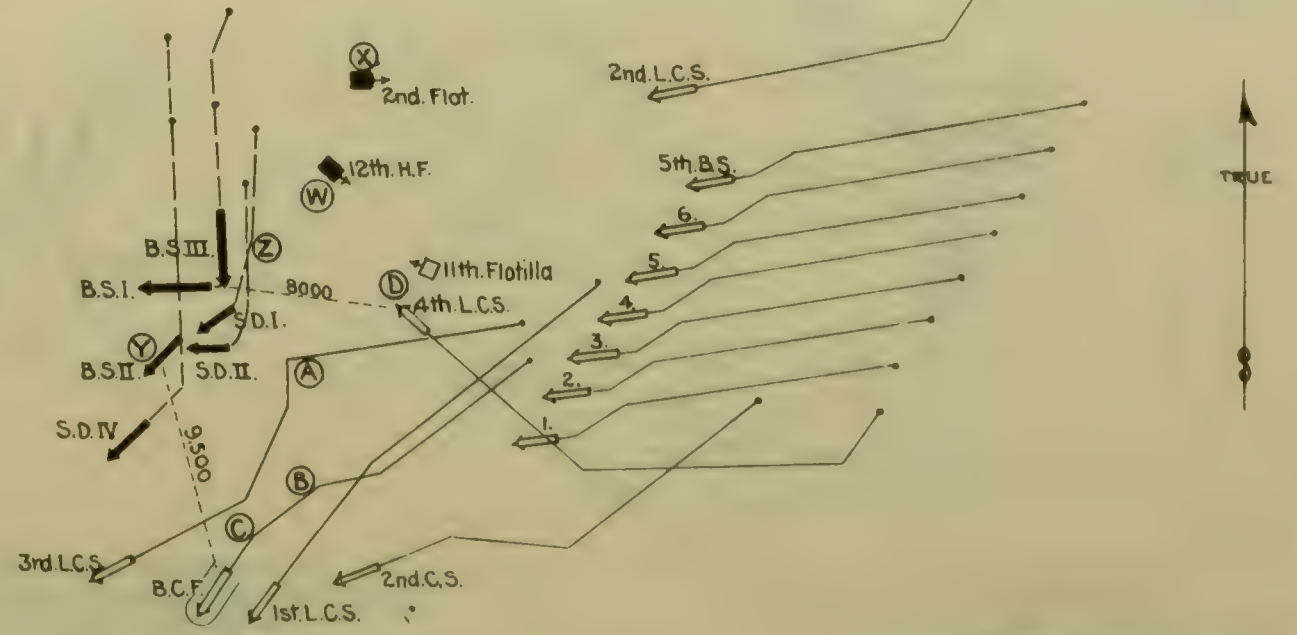
MOVE 13, 7:30 to 8:00 P.M.

German Notes.

Z. Scouting Division I engages B.C.F.
Y. Battle Squadron II engages B.C.F.
X. 2nd. Flotilla returns via Skaggerak after making this attack; one boat hit by 2nd. L.C.S. at 8.30 and another at 9:00.
W. 12th Half Flotilla fires torpedoes, of which three pass through British line.

British Notes

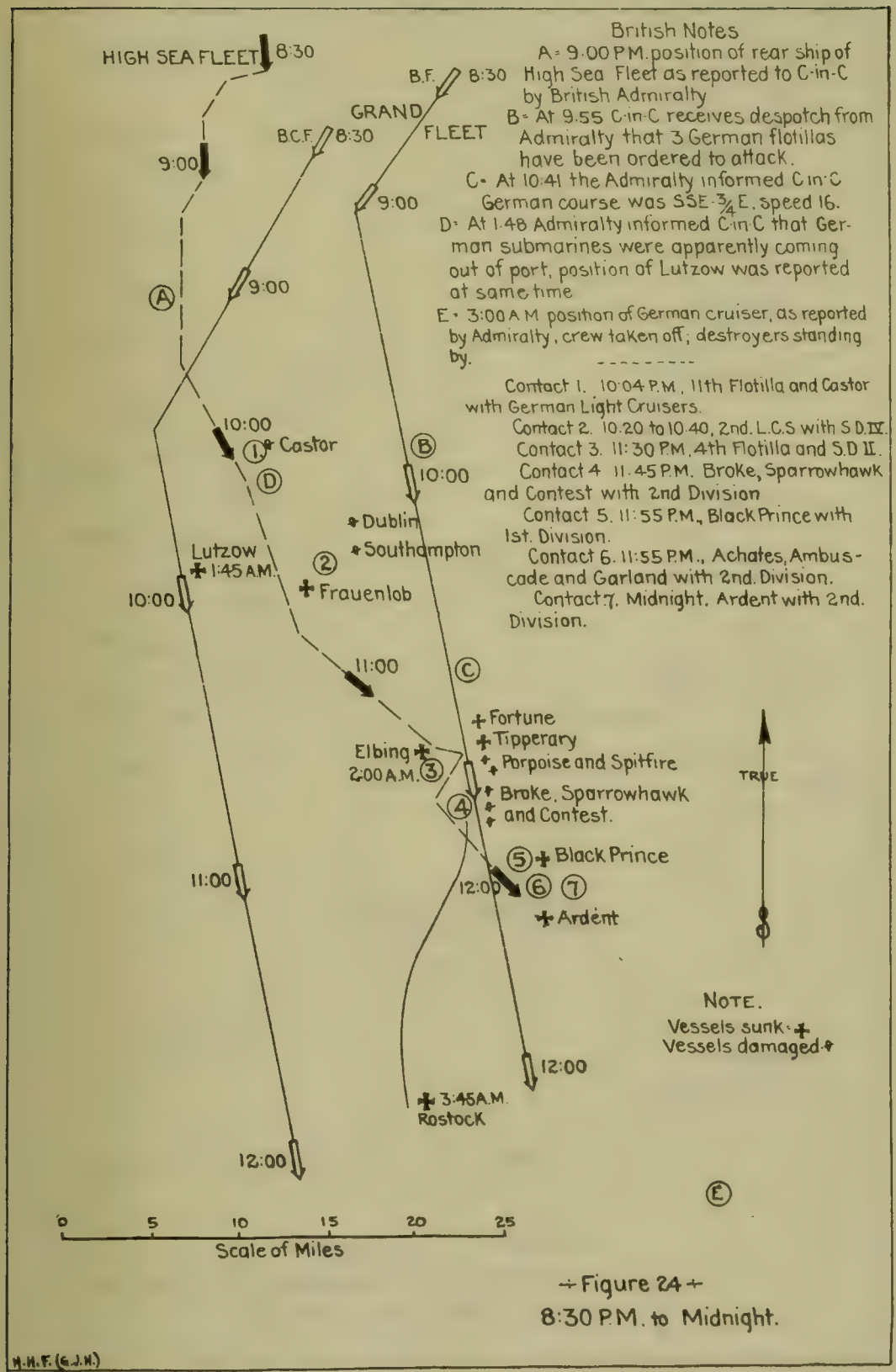
A. 3rd L.C.S. sights High Sea Fleet at about 8:18. At 8:00 this squadron had searched to Westward in scouting line in accordance with instructions of S.O., B.C.F.; 3rd L.C.S engages S D IV.
B. B.C.F. engages S.D I.
C. B C F engages B.S.II.
D. 4th L.C.S. makes contact with German battleships; drives off 12th Half Flot Calliope hit by heavy shell; fires one torpedo. In a later contact at 9:10 Caroline fired two and Royalist one torpedo at German battleships



H.H.F. (C.J.H.)

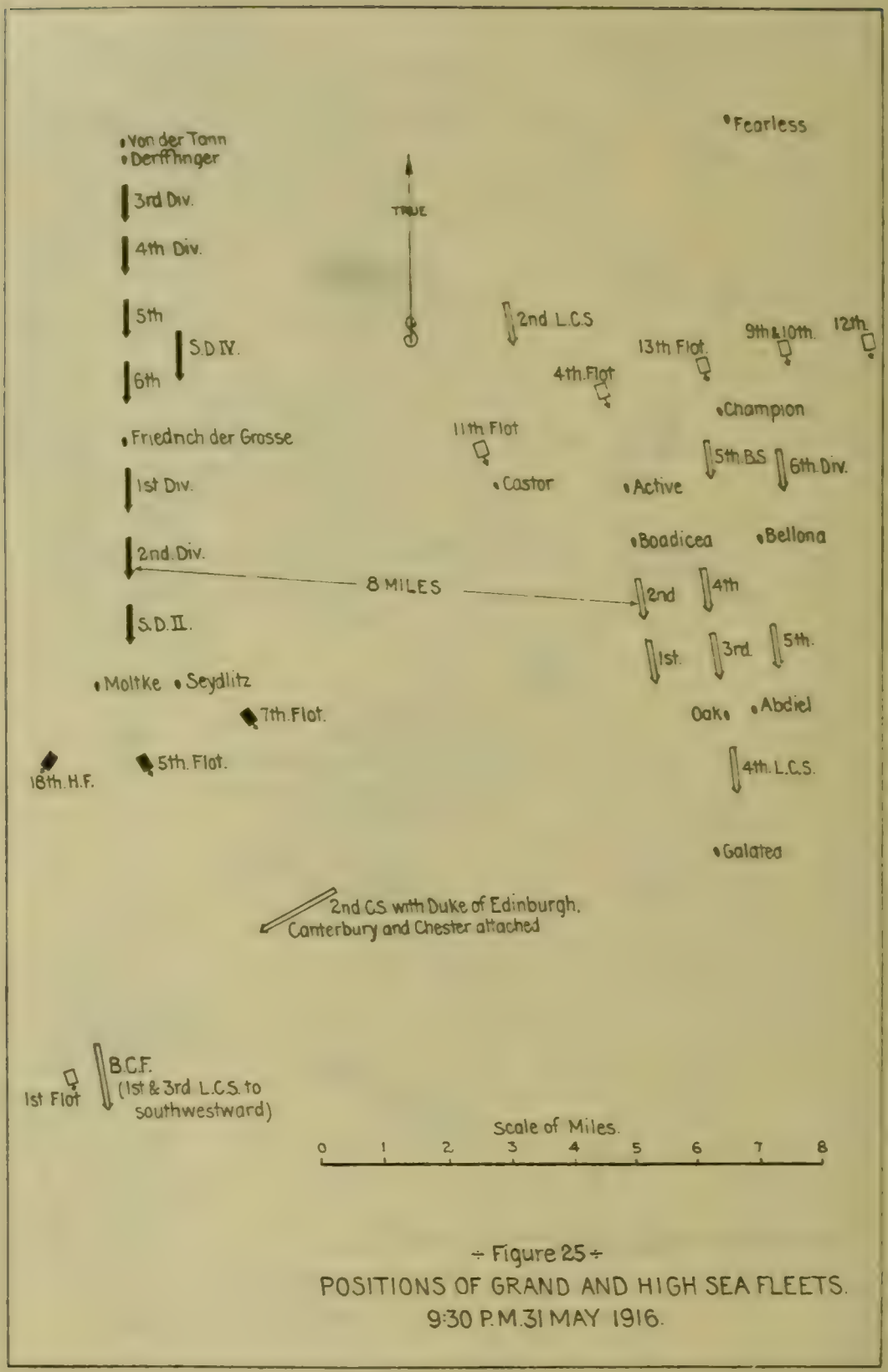
Figure 23

MOVE 14, 8:00 to 8:30 PM


British Notes
A= 9.00 P.M. position of rear ship of High Sea Fleet as reported to C-in-C by British Admiralty
B= At 9.55 C-in-C receives despotch from Admiralty that 3 German flotillas have been ordered to attack.
C= At 10.41 the Admiralty informed C in C German course was SSE-¾E. speed 16.
D= At 1.48 Admiralty informed C-in-C that German submarines were apparently coming out of port, position of Lutzow was reported at same time
E= 3:00 A M position of German cruiser, as reported by Admiralty, crew taken off; destroyers standing by.
Contact 1. 10:04 P.M., 11th Flotilla and Castor with German Light Cruisers.
Contact 2. 10.20 to 10.40, 2nd. L.C.S with S D IV.
Contact 3. 11:30 P.M. 4th Flotilla and S.D II.
Contact 4 11.45 P.M. Broke, Sparrowhawk and Contest with 2nd Division
Contact 5. 11:55 P.M., Black Prince with 1st. Division.
Contact 6. 11:55 P.M., Achates, Ambuscade and Garland with 2nd. Division.
Contact 7. Midnight. Ardent with 2nd. Division.
HIGH SEA FLEET 8:30
B.F. 8:30
GRAND FLEET
B.C.F. 8:30
9:00
9:00
9:00
10:00
10:00
10:00
11:00
11:00
12:00
12:00
A
B
C
D
E
1 Castor
2
3
4
5 Black Prince
6
7
Dublin
Southampton
Lutzow 1:45 A.M.
Frauenlob
Fortune
Tipperary
Elbing 2:00 A.M.
Porpoise and Spitfire
Broke, Sparrowhawk and Contest.
Ardent
3:45 A.M. Rostock
TRUE
NOTE.
Vessels sunk ✝
Vessels damaged ✝
0 5 10 15 20 25
Scale of Miles
H.H.F. (E.J.H.)

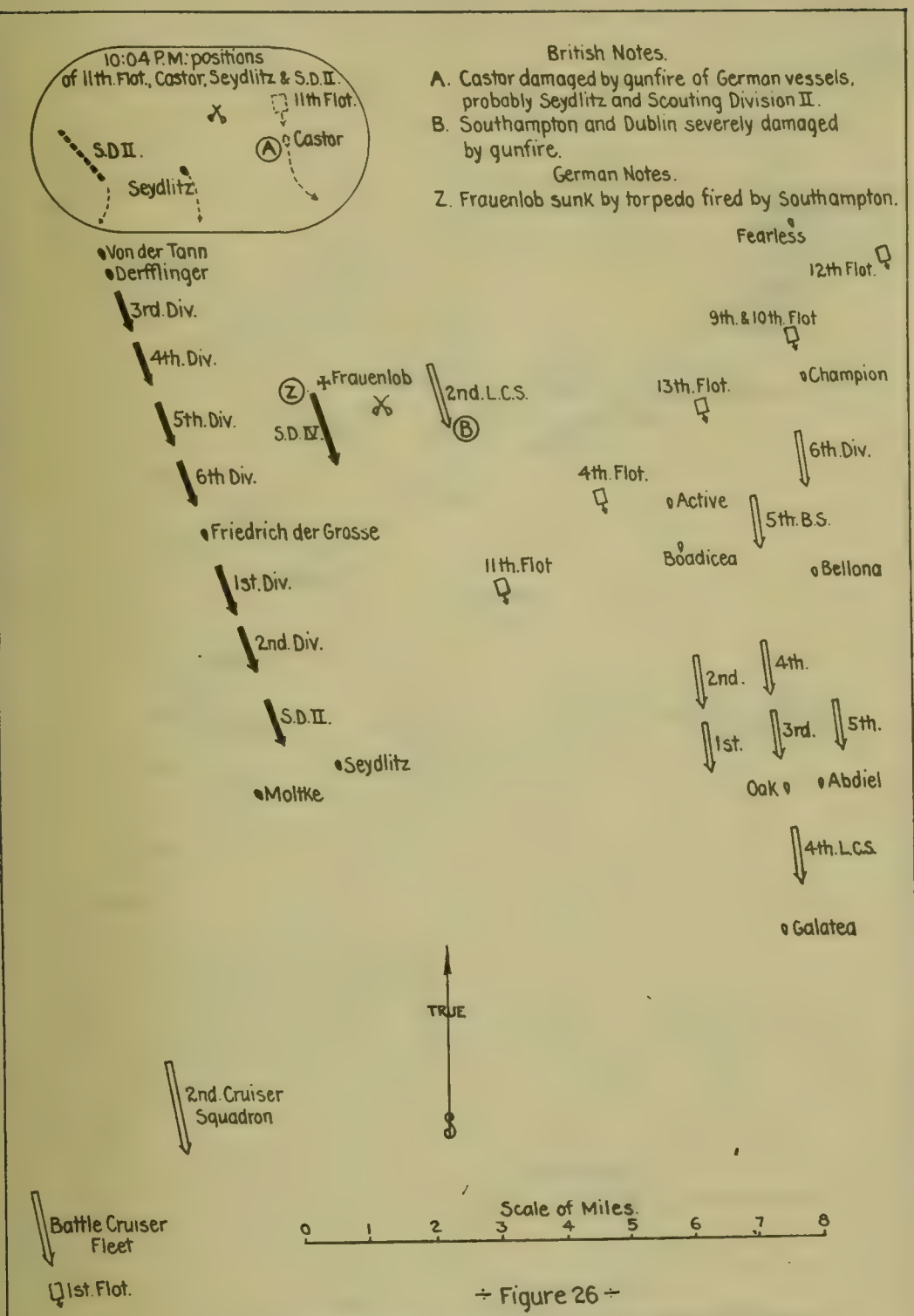
✝ Figure 24 ✝

8:30 P.M. to Midnight.



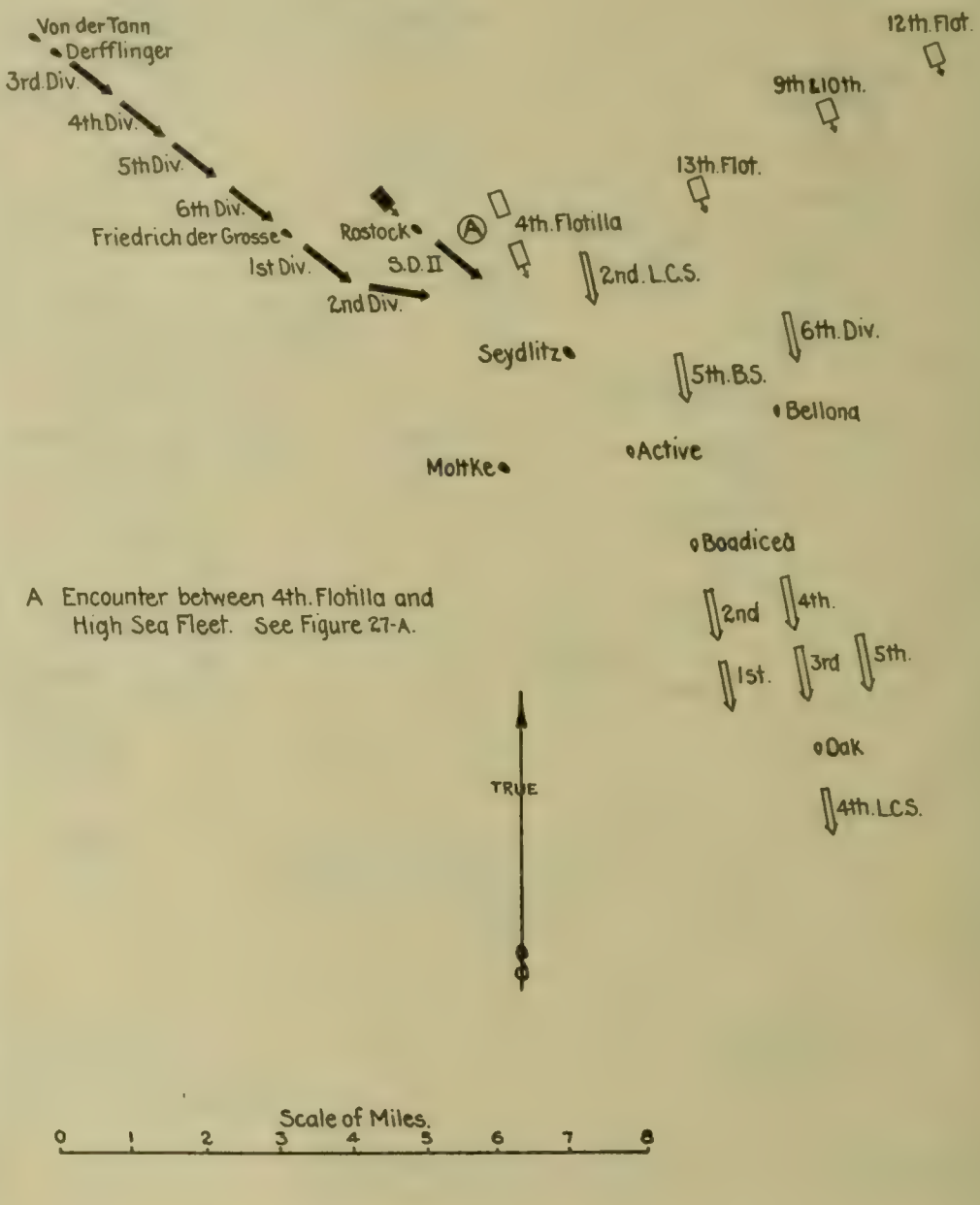
÷ Figure 25 ÷

POSITIONS OF GRAND AND HIGH SEA FLEETS.
9:30 P.M. 31 MAY 1916.



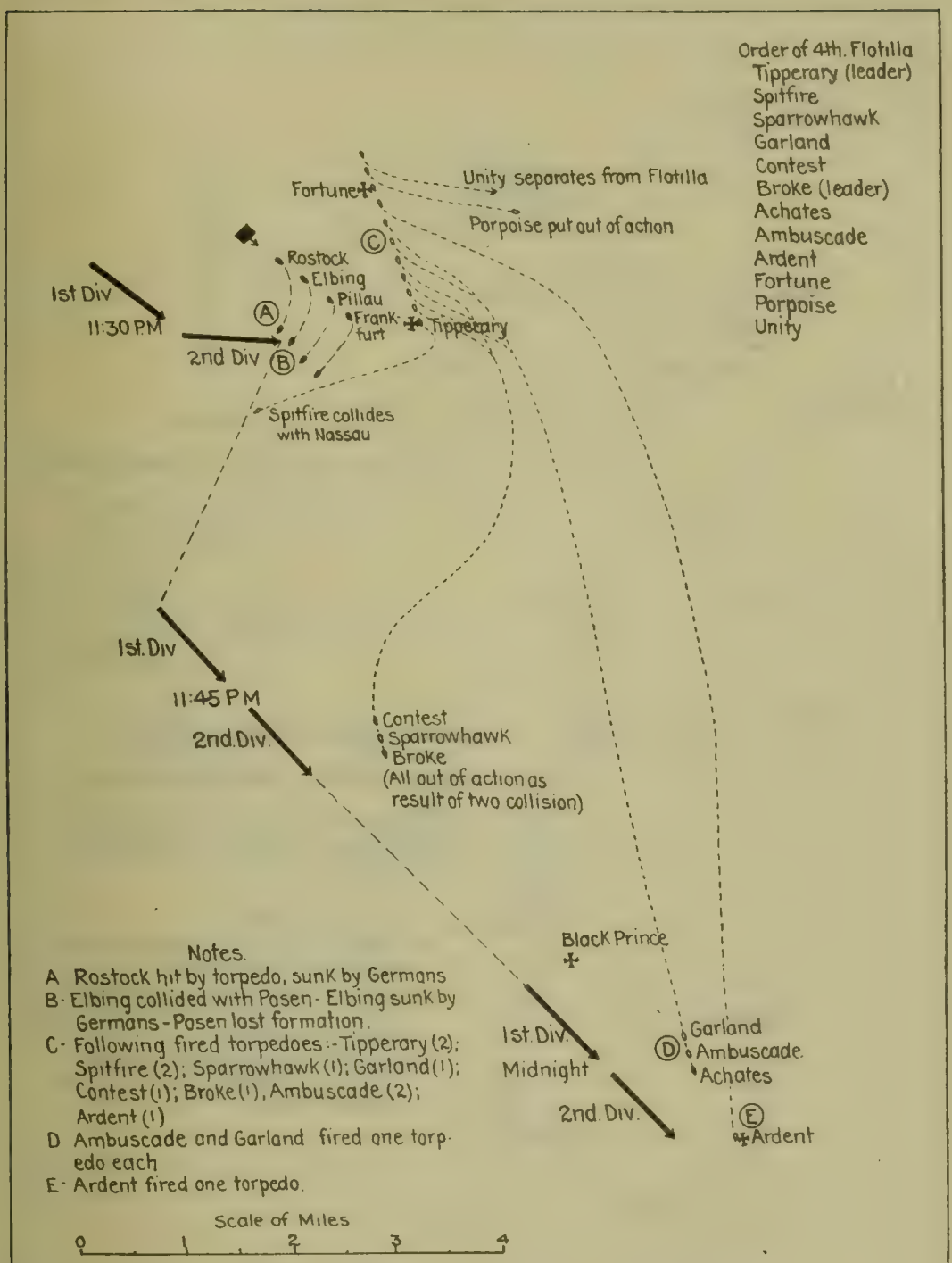
÷ Figure 26 ÷

POSITIONS OF GRAND AND HIGH SEA FLEETS.
10:30 P.M., 31 MAY 1916.



÷Figure 27÷

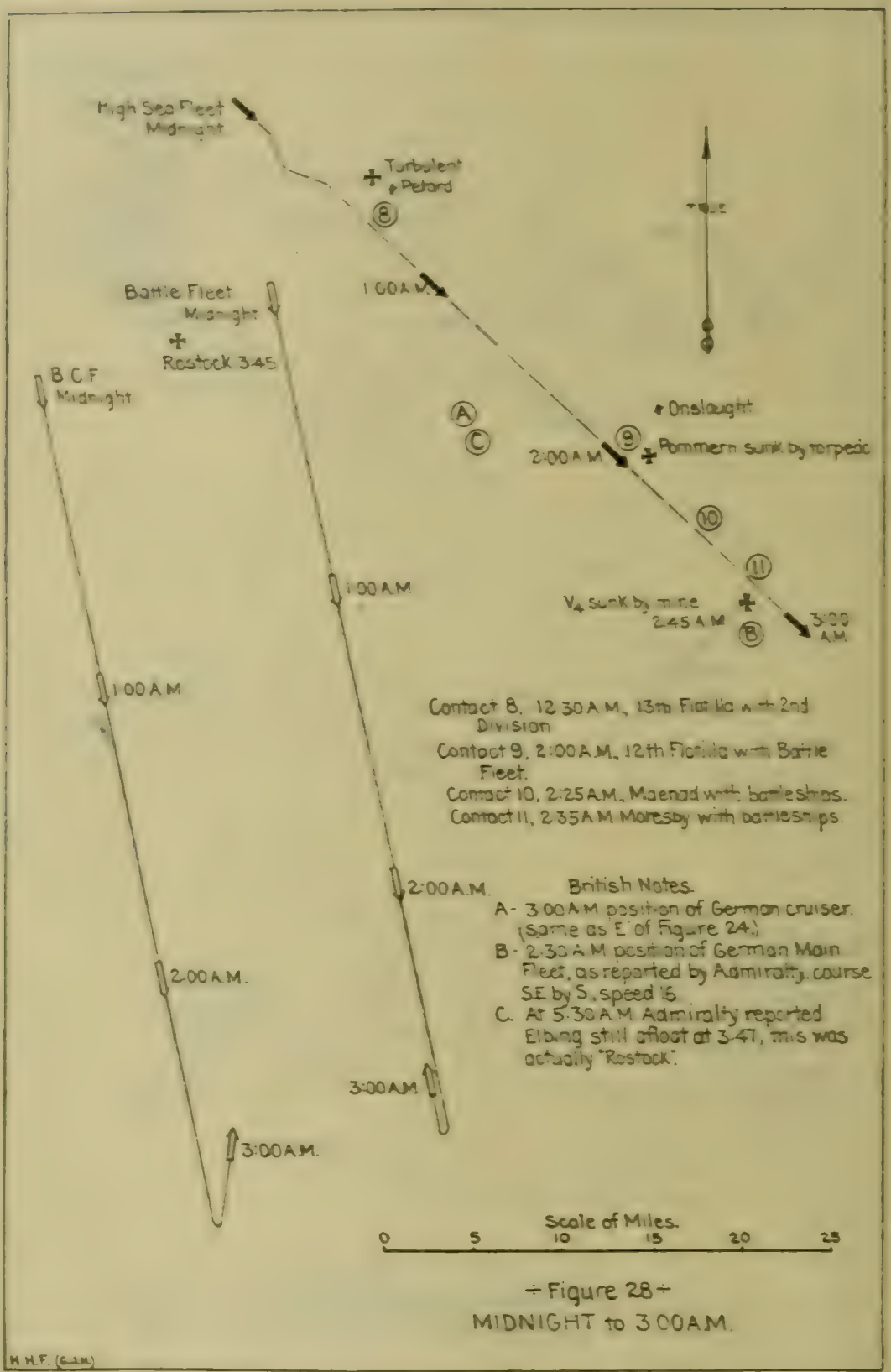
POSITIONS OF GRAND AND HIGH SEA FLEETS.
11:30 P.M., 31 MAY 1916.



— Figure 27-A —

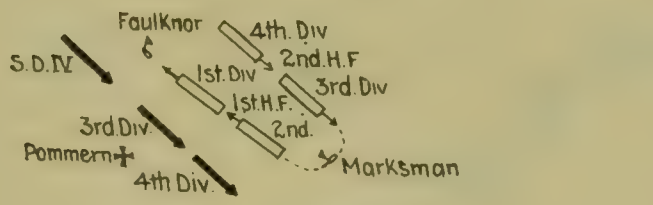
4th FLOTILLA'S ENCOUNTER WITH S.D.II AND 2nd DIVISION, 11:30 P.M. TO MIDNIGHT.

H.M.F. (G.J.M.)



÷ Figure 28 ÷

MIDNIGHT to 3.00 A.M.



Order of vessels in 12th Flotilla

Faulknor	Flotilla Leader
Obedient, Mindful, Marvel, Onslaught	1st Div
Maenad, Noble, Nessus, Narwhal	2nd Div

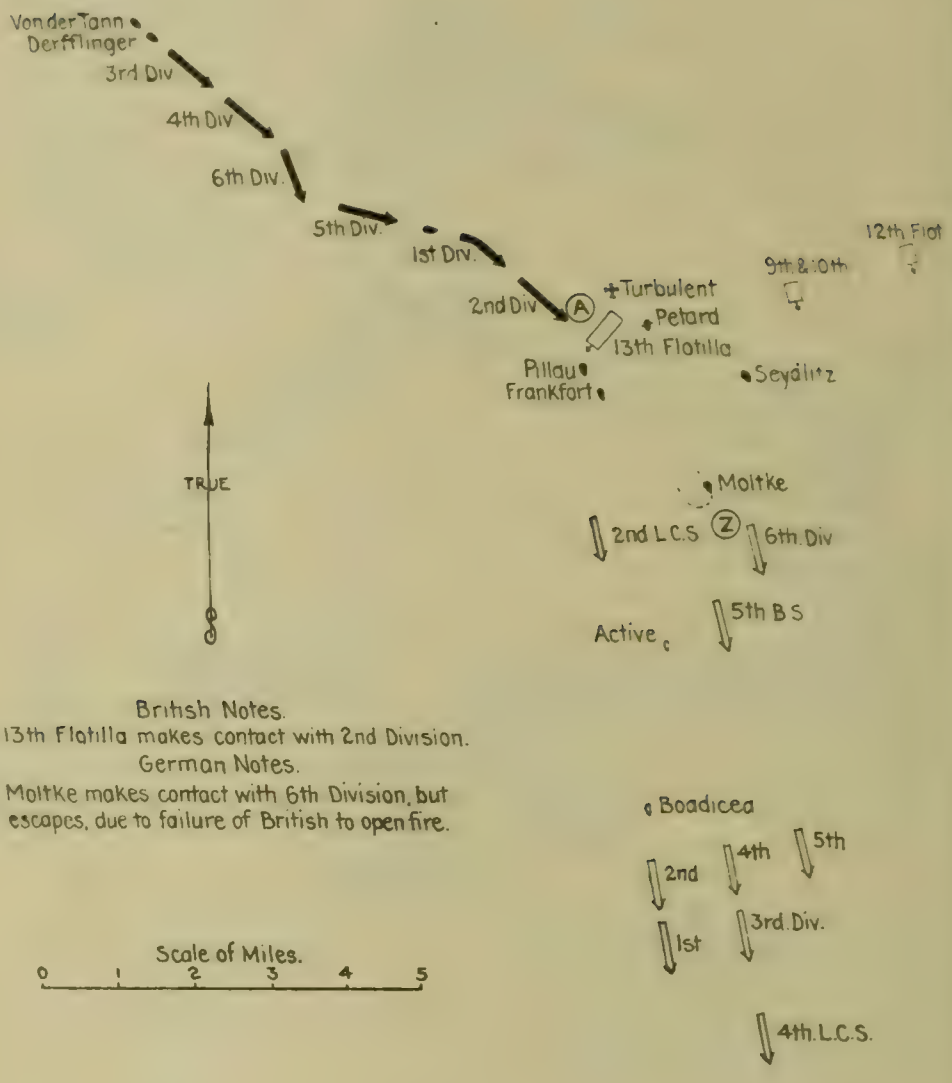
Marksman - Leader of 2nd. Half Flotilla
3rd. Division, 4th. Division } Did not Attack.

Torpedoes were fired by:-

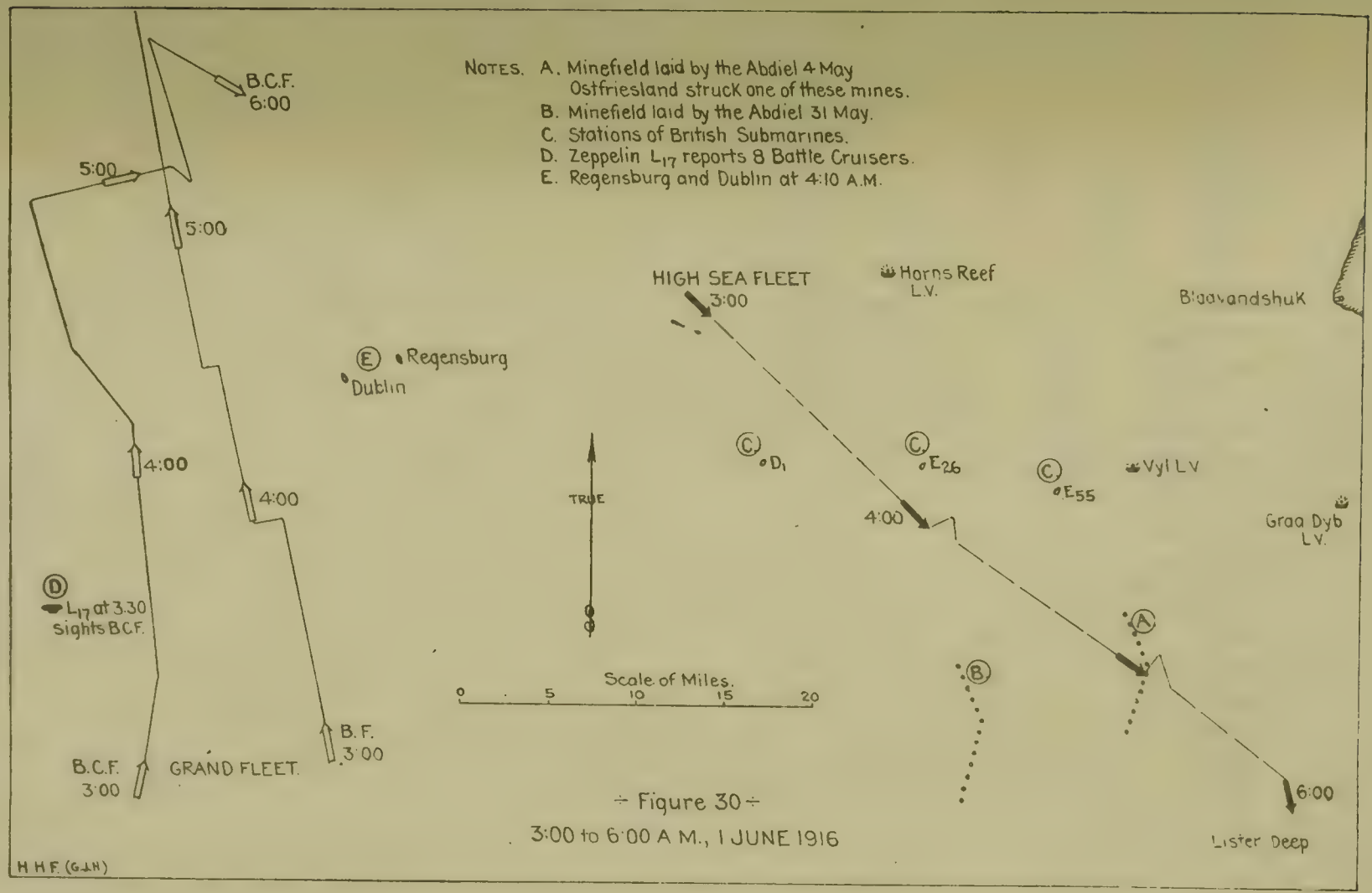
Faulknor	2	Onslaught	4
Obedient	2	Maenad	3
Marvel	4	Narwhal	2
total torpedoes			17

Figure 28-A.
ATTACK OF 12th. FLOTILLA
2:00 A.M., 1 JUNE 1916.

H.H.F (G.J.H.)



÷Figure 29÷
POSITIONS OF GRAND AND HIGH SEA FLEETS
12:30 A.M., 1 JUNE 1916.



÷ Figure 30 ÷

3:00 to 6:00 A.M., 1 JUNE 1916

OFFICE OF NAVAL INTELLIGENCE
NAVY DEPARTMENT
Washington, D. C.

MONTHLY INFORMATION BULLETIN

VOLUME VIII—NUMBER 9

MARCH, 1926

DISTRIBUTION

In general: Bureaus of the Navy Department; all force commanders; all commanding officers of capital ships, the larger patrols, destroyers, and submarines.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1926

CONFIDENTIAL

OFFICE OF NAVAL INTELLIGENCE

MONTHLY INFORMATION BULLETIN

VOL. VIII, NO. 9—MARCH, 1926

FOR CONVENIENCE IN ROUTING

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MEDICAL OFFICER			
SUPPLY OFFICER			
FIRST DIVISION OFFICER			
SECOND DIVISION OFFICER			
THIRD DIVISION OFFICER			
FOURTH DIVISION OFFICER			
FIFTH DIVISION OFFICER			
MARINE OFFICER			

The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

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1926
no.9

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ROHRBACH ALL-METAL FLYING BOAT RO-III, SHOWING EMERGENCY SAILS SET

The parts of this plane are fabricated at the Rohrbach factory in Berlin and assembled at branch factories located in Copenhagen, Glasgow, and Japan

CONFIDENTIAL

O. N. I. MONTHLY INFORMATION BULLETIN

VOL. VIII MARCH, 1926 No. 9

ARGENTINA

MISCELLANEOUS NOTES

Proposed world cruise of "Sarmiento"

The Argentine Ministry of Marine has stated that it is proposed to send the training ship *Sarmiento* on a cruise around the world commencing during the year 1926. A route being studied is that from Buenos Aires around the coast of South America to San Francisco, from there to the Far East, afterward by way of India, the Red Sea, Suez Canal, Mediterranean, North Atlantic Ocean, returning to Buenos Aires.

The last cruise of this character was made during the years 1899 and 1900 and required a period of 22 months. Evidently the present overhaul of the *Sarmiento* in the shipyards at Liverpool, England, was for the purpose of preparing her for the cruise around the world.

Prize awarded to most efficient ship, 1925

General Order No. 5 of the Ministry of Marine, dated January 5, 1926, indicates that the armored cruiser *General San Martín* has obtained the highest classification among the boats competing for the "efficiency" prize of the year 1925, and the *Belgrano* has been awarded second place, there being a slight difference in the classifications "general inspection" and "communications." The prizes will be awarded at an early date.

Proposed purchase of munitions in Denmark

A member of the arms commission of the Argentine Government, Artillery Lieut. Carlos A. Cattaneo, recently visited Copenhagen for the alleged purpose of studying Danish machine guns. In an interview given to the Radical-Liberal evening paper, "Ekstrabladet," Mr. Cattaneo stated that his Government had obtained quotations from the United States, Sweden, and Denmark, but that the

offer of the Danish Recoil Rifle Syndicate is the most advantageous and will probably be accepted. Mr. Cattaneo left recently for Brussels in order to report to the chief of the Argentine Munitions Purchasing Commission there.

CHILE

MISCELLANEOUS NOTES

Proposed purchase of munitions in Denmark

Two Chilean officers, Col. Roberto Thumada and Col. Carlos Sacz, recently paid a visit to Copenhagen, which they declared to be of a quite private nature.

According to the Radical-Liberal paper "Ekstrabaldet," however, the gentlemen in question carried on negotiations both with the Danish Foreign Office, the Ministry of War, and the Ministry of the Marine, and the paper therefore hinted that the persons in question came to buy Danish arms, presumably recoil rifles. This presumption is confirmed to a certain extent by the fact that an airplane was recently purchased by the Chilean Government from Svenska Flygmaskinfabriken in Linhamn (Juncker). It is also worthy of note that, at a dinner given for the Chilean officers by the Chilean consul general, Mr. Adolph, the following Danish officials were present: The commanding general of the Danish Army, Gen. Ellis Wolff; the commander of Copenhagen, Major General Nyholm; Admiral Rechnitzer, director of the Ministry of the Marine; Department Chief Engell, acting director of the Danish Foreign Office; and Mr. Wadsted, former Danish minister to Argentine.

The Chilean Minister accredited here is at present in Chile, so that there is no Chilean diplomatic representative at this time in Copenhagen.

The Chilean general who had the authority to make the deal did not come with the other officers, owing to illness. The other two officers came here and got all the necessary information, whereupon one of them returned to Paris to inform the general, while the other went on to Sweden.

It seems probable, according to information obtained from one of the directors of the Danish Recoil Rifle Syndicate, that the deal either has been closed or is about to be closed very shortly, because it is known that on the evening of November 11, the party in question sent a long cable to Chile in code. The natural inference is that this message had reference to the order for arms. The exact extent of the order has not as yet been ascertained.

Organization of a commercial air service in Chile

The following is a translation from the newspaper "El Mercurio" on the above subject, January 23, 1926:

ORGANIZATION OF A COMMERCIAL AIR SERVICE IN CHILE

Through the medium of the press, our readers are informed of the efforts being made to establish in this country a commercial air service similar to that which exists in all the countries of Europe to-day.

Wishing to give some information to our readers, considering the unquestionable interest of this subject, we interviewed yesterday afternoon Senor don Luis Testart, who was the first to launch the idea of establishing commercial aviation, and to which end he has struggled with great perseverance for the past six years.

Senor Testart is very well known in Valparaiso; he is president of the French colony and director of the Fifth Company of Firemen; he is a business man, who has by his unusual business capacity, contributed much to the prosperity of this country.

I do not have the least inconvenience, he told us, in furnishing to you some details of the organization of this service. The most important part of the business is laid in Santiago now that we have installed an office there, which has involved enormous labor.

To-day we only need the planes—the preliminary work has been done. Almost six months have been consumed in drawing up maps of air navigation, in making calculations of the consumption of equipment, in determining the landing fields in the various provinces, and in studying which is the type of plane best suited to our country.

In a short time we will have here in Chile commercial planes bigger and more powerful than any that have hitherto been flown in the country. These planes will be destined to explore the line between Santiago and Antofagasto and the intermediate points which may be justified by their importance. These planes will carry passengers, letters, papers, messages, revenues, etc., and the journey can be made in not more than six hours.

The great French firm, the head of which is Mr. Henri Potez, and the construction house of Lorrain-Deitrich, builders of the famous Lorrain-Deitrich motors, are greatly interested in this project—the latter firm having recently subjected their motors to an important test—to fly 32 consecutive hours.

These two firms are strongly allied in our efforts, and their assistance is important to us, the assurance of the accomplishment of which I do not doubt a single instant, even though some people still insist that I am a dreamer.

Don José Luis Sanchez Besa, who has just arrived in our country to assist us in our work with his great ability, has brought us the well wishes of these two great firms—you know the prestige which Senor Sanchez Besa enjoys in the world of aviation. Now he is working with great enthusiasm in Santiago in company with the French technician and great pilot, Don Edward Deckert.

I must urge them to hurry things along, so that very soon Senor Besa can come to Valparaiso. It is probable that he will arrive at Vina Del Mar this coming Monday, and then I shall take the opportunity to visit the press and give you much more information.

In conclusion Senor Testart said to us—I wish to take this opportunity to thank the "Mercurio" for the occasion given me to speak to the public, and to make known to the business men of our country that we hope and expect much from their cooperation, so much more because commercial aviation will be to them of the greatest benefit.

DOMINICAN REPUBLIC

PROPOSED INTERISLAND AIR SERVICE

[From a consular report]

It was recently reported that French and German interests had approached the Dominican Government in a desire to inaugurate certain seaplane and airplane services. The German interests have not as yet submitted a definite or concrete proposal, but have confined their negotiations to informal conferences. The French interests, however, have submitted a definite proposal covering a proposed aerial service between Santo Domingo, Porto Rico, Santiago de Cuba, with connection to Habana.

FRANCE

PROGRESS OF NAVAL BUILDING PROGRAM

The following information gathered from various sources is believed to be accurate, but no submarine data can be checked as the French Ministry of Marine refuses to permit any submarines under construction to be visited.

Type and name	Building	Per cent completed	Date of completion
Light cruisers:			
Duguay-Trouin	Brest	97	June, 1926.
Primauguet	do	85	December, 1926.
Lamotte-Piquet	Lorient	90	July, 1926.
Duquense	Brest	65	December, 1927.
Suffren	do	5	December, 1928.
Tourville	Lorient	40	January, 1928.
Destroyer leaders:			
Tigre	Nantes	100	Trial trips.
Jaguar	Lorient	100	Do.
Chacal	St. Nazaire	95	July, 1926.
Leopard	do	95	Do.
Lynx	do	95	Do.
Panther	Lorient	80	September, 1926.
Guepard	do	5	January, 1928.
Bison	do	0	Do.
Lion	Unassigned	0	Do.
Destroyers:			
Bourrasque	Dunkerque	100	Trial trips.
Simoun	St. Nazaire	100	Do.
Orage	Caen	100	Do.
Sirocco	St. Naziare	70	July, 1926.
Trombe	Harfleur	65	Do.
Cyclone	Le Havre	65	Do.
Mistral	do	65	Do.
Ouragan	Caen	70	Do.
Tempete	Nantes	65	Do.
Tornado	Bordeaux	65	Do
Typhon	do	70	Do
Tramontane	do	65	Do.
Le Mars	Caen	5	December, 1927.
La Fortune	do	0	Do.
L'Adroit	Dunkerque	5	Do.
L'Alcyon	Harfleur	5	Do.
La Palme	Nantes	10	Do.
La Railleuse	do	5	Do.

Type and name	Building	Per cent completed	Date of completion
Destroyers—Continued.			
Brestois	Nantes	0	June, 1927.
Bordelais	Bordeaux	0	Do.
Basque	do	0	Do.
Boulonnais	Dunkerque	0	Do.
Submarines, first class:			
Requin	Cherbourg	100	Trial trips.
Narval	do	?	July, 1926.
Souffleur	do	100	Trial trips.
Morse	do	?	July, 1926.
Caiman	do	?	December, 1926.
Redoutable	do	?	July, 1926.
Vengeur	do	?	December, 1927.
Pascal	Brest	?	Do.
Pasteur	do	?	Do.
Marsouin	do	100	Trial trips.
Phoque	do	?	June, 1926.
Poncelet	Lorient	?	January, 1928.
Henri Poincaré	do	?	Do.
Dauphin	Toulon	100	Trial trips.
Espadon	do	?	December, 1926.
Archimede	do	0	Contracted.
Monge	do	0	Do.
Fresnel	do	0	Do.
Submarines, second class:			
Circe	Chalons-sur-Saône	?	July, 1926.
Calypso	do	?	Do.
Ondine	Le Havre	?	Do.
Ariane	do	?	Do.
Eurydice	do	?	Do.
Danae	do	?	Do.
Galatee	Nantes	?	Do.
Naiade	do	?	May, 1926.
Sirene	do	?	Do.
Nymphe	do	?	July, 1926.
Thetis	Bordeaux	?	Do.
Doris	do	?	Do.
Submarine mine layers:			
Saphir	Cherbourg	0	Contracted.
Turquoise	do	0	Do.
Oil tanker: Loing	St. Nazaire	80	July, 1926.

Cruisers "Duquesne," "Tourville," "Suffren," 10,000 Tons

The eight antiaircraft guns previously thought to be 47 millimeters should be given as 40 millimeters. The ships are practically without protection, having only splinter protection for magazines, gun shields, conning tower, and communication tube. The forward engine room is amidships with two boiler rooms forward and aft of it.

HULL CONSTRUCTION

The hull is built on a longitudinal system of framing with transverse frames spaced 2.5 meters. No special steel is used, all structural parts being of standard 50-kilogram tensile strength. There are four boiler rooms (two boilers each) and two engine rooms. The forward engine room (for outboard screws) is in the middle of the boiler rooms. The magazines are inclosed in splinter boxes with sides, top, and ends of special steel. Sides are triple plate, 10 millimeters plus 10 millimeters plus 30 millimeters. The top is 20 millimeters and 20 millimeters on ends. There is a continuous longitudinal bulkhead forming side tanks for fuel, etc., which is an

important part of the ship's girder. A double bottom is worked between these longitudinal bulkheads. There are two strength decks, the upper, "premier pont," and the lower, "pont principal." The forecastle is raised one deck height above this and continues as a partial deck (pont de passerelle) abaft the bridge to the third turret. It is not a strength deck.

The first bulkhead is interesting in that it is made V shaped, pointing forward and well supported by plates. The object is to permit speed at sea with a damaged bow.

Weather decks are wood covered.

The battery is arranged as follows:

Six 40-millimeter antiaircraft guns near after bridge....	
Two twin turrets forward and aft (8 inches).	
Eight 75-millimeter antiaircraft guns abaft bridge ...	probable.
Two 4-millimeter antiaircraft guns on quarterdeck....	
One triple torpedo tube on each side (6 spare torpedoes).	

This arrangement is not confirmed as to antiaircraft guns and possibly the arrangement shown in Jane, 1925, may be correct.

There is a fire-control house with range finder in foretop; secondary gunners control house with range finder on top C. T.; torpedo-control station in sides of C. T.; and a central station below. The spotter is in a crow's nest on the topmast. Fire control as for 8,000-ton class.

The designed S. H. P. is 132,000, with which a speed in excess of 35 knots is expected. A new and high capacity type of oil burner has been developed for these vessels, reported to burn 1,000 kilograms of oil per burner per hour. There are 9 burners per boiler of 1,300 square meters heating surface.

It will be noted that the torpedo armament of the 8,000-ton class is cut in half for the 10,000-ton class.

In general the 10,000-ton cruisers are similar to the 8,000-ton cruisers as to construction and arrangement with important exceptions as to arrangement of engine and boiler rooms as noted above and in having the catapult amidships instead of aft. Gasoline stowage is in the extreme stern in tanks mounted above the water line with quick dumping valves.

Ordnance Notes—Cruisers "Lamotte" - "Picquet" Class, 8,000 Tons

The 6-inch mounts on the 8,000-ton cruisers are in regular turret structures, 1 to 2 inches thick, mounted on control rollers with electric training gear. The two guns are 6 inches, 45 caliber, 850 m/s velocity; weight of projectile 49 kilos. Fitted with the De-Bange system of abstraction, the breech plugs opening up and being conter weighted. (This to prevent water and dirt from falling

on the mush room.) There are two air and one water jets for gas ejection—the air pressure used is 110 kilos per square centimeter (1,550 pounds per square inch).

The two guns are in separate slides—the trainer's position is between the guns, but slides may be cross connected and both guns handled from either elevating position. The guns are fitted with spring rammers which are compressed by recoil of the gun, and released by a trigger to ram shell home. Shell is carried on revolving loading tray pivoted on gun slide and revolving in horizontal plane.

The ammunition comes up outboard of either gun—there are two cartridge bags to each charge. The gun is fitted with straight telescopes for gun sights which look out through holes in face plate, about 18 inches square. Turret is fitted for director firing, guns being layed by " follow the pointer system." Turrets under pressure from blower drawing air from overhang, but not gastight.

There is an upper handling room and ammunition reaches it from the lower handling room by a balanced hoist with two cars—one is down when other is up—cars pass each other half way up—each car holds two projectiles and four powder bags (two rounds—one for each gun). In lower handling room there is an elaborate apparatus for loading 6-inch shells into cars which is admittedly totally unnecessary as shells weigh only 49 kilos each. Powder bags come in metal airtight tanks stowed on shelves in magazine. (Ship's officers had never heard of bulk stowage.)

Magazine and shell rooms can be flooded from two stations on deck, one forward for forward group and one aft for after group—or all can be flooded from central station. These control stations have small pump which works control valves to flood, and is locked when not in use. No method of operating control valves from either magazine, shell room, or handling rooms, and it was stated that the object of this was from a fear of sabotage or panic and that they did not want enlisted men to be able to flood.

22-INCH TRIPLE TORPEDO TUBES

Four triple tubes and 12 spare torpedoes are supplied. Tubes are very low to deck on cruisers and high on destroyers and destroyer leaders. All tubes are the same. Tubes have powder and air impulse for firing—middle tube is slightly to rear of outboard tubes so as to work doors which are side swing and do not drop. All tubes fitted with electric training in addition to hand train. On cruisers the training motor is hung up on deck under tube foundations and does not rotate. Training pinion projects through deck and engages toothed arc on the torpedo tube. The tube is trained

by a tube layer who follows the pointer on a receiver—he also has voice tube to firing pointer at seat on tube above him.

On destroyers the training motor is on the rotating tube and the trainer sits on the opposite side from the firing pointer. This system is much preferred by French officers and they say that electric training gear is essential for proper and efficient torpedo control.

3-INCH ANTIAIRCRAFT GUNS

Four 3-inch semiautomatic (75 millimeters). No special system of control yet adopted by the French Navy. Two antiaircraft range finders, 2 m. base (one each side near guns). Stated that machine-gun fire from Hotchkiss 13 millimeters was best weapon that they had.

FIRE CONTROL

Gunnery officer's station is in the foretop with fire director and range finder. Assistant gunnery officer is in gun-control tower in center of fire-control tower. Plotting room below outboard of central station has Le Prieur Conjugateur graphique and usual instruments—15 men and 1 officer.

No fire-control station aft. Only in foretop and conning tower. Spotter in crow's nest above foretop.

TORPEDO CONTROL

Two torpedo directors in conning tower—one each side of tower—torpedo officer stationed here. There is a torpedo-tracking room adjacent to plotting room. Range finder for torpedo control on top of conning tower. Propose to use fixed tube system of torpedo control.

Flotilla Leaders, "Chacal" Class

The building program includes nine flotilla leaders of 2,400 tons normal displacement (2,600 tons in service with stores) as follows:

Name	Building at	Per cent complete	Date of completion
Chacal	St. Nazaire	95	July, 1926.
Leopard	do	95	Do.
Lynx	do	95	Do.
Tigre	Nantes	100	February, 1926.
Jaguar	Lorient	100	Do.
Panthere	do	80	September, 1926.
Lion [1]	Contract not placed	0	January, 1928.
Bison [1]	Lorient	0	Do.
Guepard [1]	do	5	Do.

[1] These vessels are 200 tons greater in displacement.

Examples of this type are to be seen at St. Nazaire, Lorient, and Brest. In general, work on these ships is being pushed rapidly, and the expected dates of completion may be anticipated. The machinery in particular has proved very successful, and great confidence is felt as to the success of the high-power boilers used. These vessels mark an enormous advance in engineering, as well as a bold attempt at a light hull construction following destroyer practice. On her trials the *Tigre* made 36.7 knots. It is too early to obtain any considered opinion as to the seaworthiness, stability, and rigidity of these vessels in service. They are evidently very lightly built but with good freeboard and high bridges, and should have a high sea speed if not pounded too hard. There is considerable top hamper, and during construction some difficulty was had in keeping the center of gravity low to assure adequate stability. Alterations were made in the original design which included reduction of battery by one 5.1-inch gun and substitution of wood for steel of tripod mast legs.

Hull construction.—Normal displacement, 2,400 tons (2,600 tons with stores). Two wooden tripod masts, stiffened with rods between legs to stop vibration. No special steel used in hull, all being standard ship steel of 50 kilograms per square millimeter tensile strength. No galvanizing is done on plates at above 5 millimeters in thickness. Frame spacing is 2.1 meters; lightened plate with angles. Angle bulb used only as intermediates and for intercostal stiffening. Longitudinal system of framing consists of a keelson and two longitudinals on each side of the keel, longitudinal bulkheads forming side oil tanks and two longitudinal stringers under main deck. There is no double bottom. Space under boilers is used for pipes and general access. Feed water is in side tanks.

The bridge is of good size, with the central portion covered and glass inclosed. The captain's emergency cabin and the chart room open off the bridge inclosure. Magnetic and gyro (Anschütz) compasses are fitted together with the usual ship-control apparatus. A searchlight is carried just over the navigating bridge on each side. This location has been found unsatisfactory and will be changed by moving one light to the mainmast and mounting the other on the foremast somewhat higher than at present.

Subdivision.—Three boiler rooms (three stacks) two engine rooms. No doors in transverse bulkheads.

Equipment.—Linoleum covers the weather decks forward and aft, but amidships nonslip treads are screwed down along each gangway. A 2-foot high breakwater extends across forecastle forward of anchor engine. Two patent anchors of about 3,500–4,000 pounds are carried in hawse pipes. Steam anchor engine on forecastle deck. Two kedge anchors are carried aft where there is a steam windlass. One

electric winch for boat hoisting serving two booms stepped behind bridge at sides.

Boats.—Motor gig, motor sailer (7–8 meters), motor whaler, cutter, 2 lifeboats, dingy, life rafts.

Gangways.—Two each side.

Sick bay.—Four bunks, water-closet and bath, dispensary.

Bakery.—Amidships on main deck.

Ice.—CO_2 machine and cold-storage room.

Laundry.—Under bridge.

Galleys.—Five separate coal-fired galleys.

Lighting.—Very inadequate in crews quarters.

Lockers.—Metal, on deck level, poorly arranged.

Ventilation.—Rudimentary.

Heating.—Rudimentary.

Steering.—Steam steering engine aft, with hand steering over engine room. Telemeter steering from top of after deck house.

Gasoline for boats is in a cylinder at the ship's side under boat stowage skids. A quick release lever can dump cylinder overboard instantly.

Complement.—Officers, 8; men, 200.

Commanding officer	1
Executive officer	1
Navigator officer	1
Gunnery officer	1
Torpedo officer	1
Engineer officer	2
Ensign	1
Total, plus 1 doctor and 1 paymaster for 3 vessels of the class	8

The crew is quartered forward; deck force second deck, engineer's force third deck, P. O.'s third deck abaft crew; all in hammocks.

Stateroom for each officer, small ward room; captain's cabin, state room, bath, and pantry separate.

Battery.—Five 130 millimeter S. A. guns on C. L. in pedestal mounts, fitted for director firing; 45-caliber; gun shields: maximum elevation 23°. I. V. 940 m. sec. Weight of projectile 22 kilograms. Cartridge case and projectile separate. Separate electric hoists for supply of shell and powder. Maximum rate of supply, 15 rounds per hoist per minute. Nos. 1 and 2 guns supplied by one pair of hoists under bridge. Ammunition passed by trough (light brass) to forward gun.

Midship gun has ready supply; otherwise supplied by hand from forward or after hoists.

Two antiaircraft, 75 millimeter guns, one each side amidships.

Four Thorneycroft depth charge throwers, two on a side abaft bridge.

Six Hotchkiss 13 millimeter machine guns allowed.

Mine tracks aft under main deck; openings in stern with carved rails to water. Six mines ready each side. Eight or 10 more in magazine below. Bridge-operated hydraulic control opens doors to mine passage and starts mine laying. Each magazine, flooding controlled from a station on main deck over it. Hydraulic hand-pump operation of valves; 30 seconds to operate valve; 5 minutes to flood compartment.

Two triple 22-inch C. L. torpedo tubes; electric training gear. No spare torpedoes carried. Torpedo handling gear crude.

Machinery.—Contract speed 50,000 horsepower and 35½ knots for 8 hours; to make 36 knots on last hour.

Tigre made 36.7 knots on last hour with 60,000 S. H. P.

Twin screws.

Five du Temple boilers give more steam than turbines can take. Fuel supply, 500 tons.

Two Rateau turbines per shaft, with single reduction gear, 3,000 to 350 revolutions on screw.

Cruising turbine good up to 18 knots on each shaft with hydraulic-operated declutching device.

Forward engine room contains two 60-kilowatt turbo-generators; none in after engine room. One auxiliary 30-kilowatt oil engine and dynamo on main deck for light in port. Can not operate searchlights on this, but can hoist boats.

Auxiliary boiler on main deck for heating in port.

Leopard and four others have Bréguet turbines. *Chacal* and *Lynx* with Rateau. In Bréguet installation H. P. and L. P. turbines connected by 6 to 1 reduction gear to each of the two propeller shafts. Backing turbine on L. P. shaft. Cruising turbine connected by additional reduction gear to L. P. shaft. Cruising reduction 7 to 1. Main radioroom forward, below decks, and two auxiliary stations aft. All soundproof provision for submarine signaling and listening devices and for supersonic sounding device.

NOTE.—The last three of the class (*Lion, Bison, Guépard*) are to be of 200 tons greater displacement, 6 meters longer, with five 146-millimeter guns instead of 130 millimeter. contract, S. H. P., 65,000 instead of 50,000 horsepower.

Destroyers—"Simoun" Class

Of this type there are 24 authorized of which 22 are accounted for by name in other correspondence. Three are now under trial,

15 are under construction and 4 not yet commenced but on contract.

Displacement 1,460 tons; four 5.1-inch guns; six 22-inch torpedo tubes; one antiaircraft gun (73 millimeters); no depth throwers; 12 mines aft same as *Chacal* class; 3 du Temple boilers; twin screw; Parsons turbines. Arrangements resemble *Chacal type*, except that there are no side tanks in way of engine and boiler rooms, and double bottom is fitted below boilers for water (feed). Lighter plating than *Chacal* requires steel of 60 kilogram tensile.

Aeronautical Activity of French Shipyards

The Penhoet Chantiers have an aeronautical department which has been building a giant flying boat for the past year. This is an experimental commercial type of great radius, originally planned for a possible trans-Atlantic flight. It is built under a contract with the Government (Sous-Secrétaire d'Etat de l'Aéronautique). It has a span of 40 meters and four Jupiter engines. Permission to visit was refused.

The Chantiers de la Loire have bought the airplane firm of Gourdou-Lesseure of Paris and are putting up a factory here. The Paris firm will design and build the sample planes which will be fabricated at St. Nazaire. The new firm is Loire-Gourdou.

FRANCE

CRITICAL RECRUITING SITUATION, FRENCH NAVY

The following extracts from one of the leading maritime papers show the apparent crisis in the enlisted personnel situation of the French Navy. Such conditions, and their effect on the morale of the navy, are subject to constant comment in the leading maritime papers.

We have on several occasions called attention to the present crisis in personnel of the navy, which now becomes alarming at a time when we are faced with the problem of manning our new ships about to go in commission.

The causes of the present crisis are multiple. The service, before the war, depended principally on reenlistments from the semifarmer and semimariner population around Brittany who looked forward to old-age retirement, etc.

This type of recruit, domiciled along the various rivers and waterfronts of Brittany, was always considered good material for reenlistment. By reason of their thrifty nature these men were able to save enough money to purchase a small country home wherein to spend, in comparative ease, their reclining days. We now ask the question as to why this certain class leaves the navy immediately upon the completion of their obligatory military service? It is because the navy no longer attracts them by reason of making their career depend on a small pension after 20 or 25 years service; conditions have

changed considerably in Brittany since the war. This certain type of recruit, practically poor before the war, now finds himself classed among the well to do of the Province. These semifarmer and semimariner citizens turn to the soil where they make an excellent living and are free from the many annoying and irksome details incident to a military life. It is to these conditions that we must turn to find the reasons for the present falling off in reenlistments—also to the treatment accorded excess petty officers in forcing them to retire from the service, without due consideration for the promises made them when enlisting, at the period when the Minister of Marine was adjusting the excess personnel to suit postwar conditions. The navy department has gone on record as not having kept its promises to these worthy seafaring folks; hence, lack of confidence now exists in the very centers where confidence is most needed. To retain personnel in the navy the first requisite is for the navy department to keep all promises made to men at time of enlisting. This latter argument may also be applied to existing conditions in the commissioned personnel ranks and is directly responsible for the difficulty in obtaining candidates for the École Navale.

Due to the falling off in reenlistments the navy is at present required to call on the army for thousands of recruits. These recruits, transferred to the navy against their wishes to complete their obligatory military service of 18 months, are of little use to the navy and only mark time awaiting the day of discharge from active service.

An entente is also necessary between the army and navy recruiting depots—this entente does not always exist. We find young men members of nautical clubs (members of inland nautical clubs are given to understand that they will be able to do military service in navy instead of army—should they so desire) refused enlistment in the navy and transferred by the recruiting depots to the army contingent. Such lack of liaison between the two military branches tends to throw the blame on the navy department for not making the necessary arrangements with the army recruiting depots to transfer these young lads to the navy contingent. Such lax methods have exposed the navy department to the accusation that it does not keep its promises to these young members of the various nautical organizations. The navy can not obtain the confidence of recruits by such methods; the young recruit is not concerned with the lack of liaison between the two departments—he is only aware of the failure of the navy department to keep its promise.

The Minister of Marine is well aware of the critical personnel situation and has lately issued orders placing ships in reserve in order to procure crews to man the new ships going in commission.

The reenlistment bonus and retirement has been recently increased; such measures will, no doubt, help recruiting, but with the condition that, we must again repeat, the Navy Department hold as sacred all promises made to recruits and service men.

Remarks.—In connection with the above it may be added that should the present army bill pass the Chamber, which seems practically assured, the period of obligatory military service will be reduced from 18 months to one year. This means that the navy will receive annually from the army contingent about 8,000 men, mostly machinist's mates and specialist ratings, who will only be required to serve one year in the navy. The political parties fostering the new army bill of one year service do not feel that men transferred

from the army contingent to the navy, to perform their obligatory military service, should be subjected to a longer period of service than their more fortunate comrades who remain with the army. The fact that you can not make a "sailor" in one year has been brought to their attention on several occasions, however, while agreeing from a military standpoint with the contention of the navy department, they do not see it from a political standpoint. Indeed, it would be a hard task for the politician to explain to Mr. John Doe that his son had to do three years obligatory military service, instead of one, for no other reason than the navy required his expert services as a specialist.

The navy is principally recruited from seafaring folks "Inscrits maritimes" whose period of enlistment is from three to five years. It is from this class of recruit that the navy must endeavor to get machinist's mates and other specialist ratings, should it desire to avoid the 1-year recruits from the army contingent.

As the reenlistments from the "Inscrits maritimes" are not sufficient to maintain the deck petty officer ratings at full complement, there is little hope of the navy ever obtaining specialist ratings from a seafaring population with the result that it will be compelled to rely on the 1-year men from the army contingent to fill all specialist ratings.

GERMANY

NAVAL ESTABLISHMENT

[Source: O. N. I.]

Establishment Permitted by the Treaty of Versailles

By the terms of the treaty, the German Navy is—

(*a*) Restricted in personnel, to a total of 15,000 officers and men.

(*b*) Restricted in ships to 6 battleships, 6 light cruisers, 12 destroyers and 12 torpedo boats. No aircraft or submarines permitted. Vessels allowed as reserve to the above by the Conference of Ambassadors Decision C. A. 21 (II) of March 16, 1920: 2 battleships, 2 light cruisers, 4 destroyers, and 4 torpedo boats.

(*c*) Restricted in coast defense fortifications to—

Existing fortified works and fortifications within 50 kilometers of coast or on islands off the coast, except Heligoland, and

Is forbidden by the treaty to erect any fortifications for the area between latitude 55° 27′ N. and 54° N. and longitude 9° E. and 16° E., or to install any guns commanding the maritime routes from the North Sea to the Baltic.

LIGHT CRUISER "EMDEN"

Vessels may be replaced, after age limit, with the following tonnage restrictions:

	Tons
Armored ships (20 years from date of launching)	10,000
Light cruisers (20 years from date of launching)	6,000
Destroyers (15 years from date of launching)	800
Torpedo boats (15 years from date of launching)	200

1. NAVAL POLICY

The reestablishment of German sea power by all possible means permitted by the treaty of Versailles is a concrete expression of their present naval policy. While in no position to compete with the fleets of other powers, the Admiralty holds that the navy "should neither forget how to construct ships, nor should naval maneuvers be allowed to fall into neglect. * * * the German Navy should not alone be a model navy and an instrument of maneuver but it should also protect the German coasts and German neutrality as well as acting as representative of Germany in foreign and distant waters."

Accordingly the Admiralty has embarked on a program of reconditioning and modernizing her retained vessels and of a gradual replacement of the older types. The new cruiser *Emden*, built for foreign cruising, the first of the replacement program, was commissioned in October, 1925. It is not known which old cruiser the *Emden* will replace on the navy list. A second cruiser and four destroyers are now under construction.

The retained batleships are being extensively overhauled and modernized. Germany would like to replace these but feels that the requisite qualities of armament and protection can not be realized within the replacement tonnage of 10,000, allowed by the treaty.

The staff and personnel are being organized and trained to admit of a rapid expansion to a greatly augmented strength in event of an emergency.

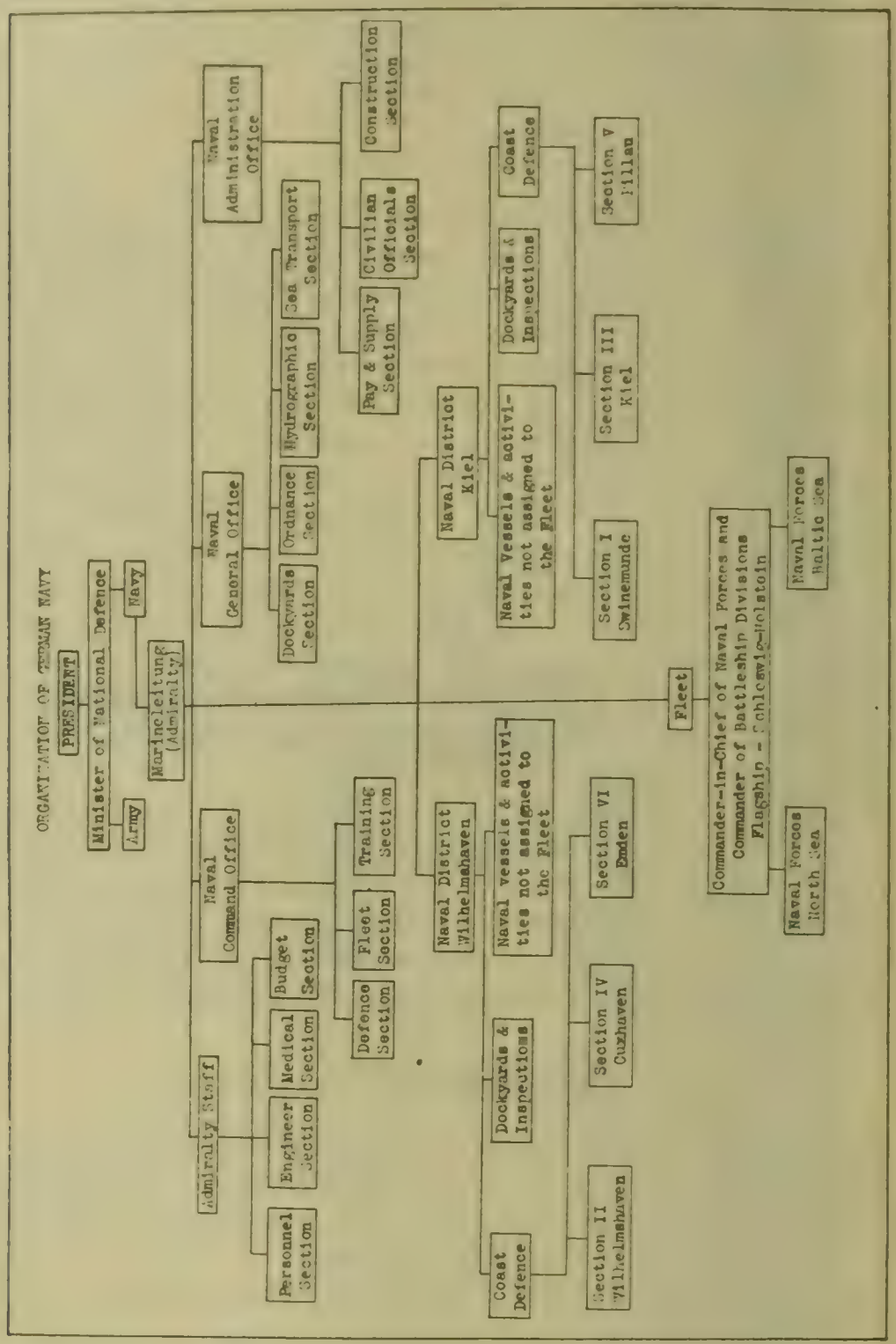
2. ORGANIZATION

The President of the Republic is commander in chief of all the forces. The minister of national defense controls the Rich-Wehr-Ministrium, under whose direction and authority are the army (Reichsheer) and the navy (Reichsmarine).

The naval command includes the forces afloat, the naval districts, and the coast defenses.

The board of admiralty (Marineleitung) is the senior command and administrative body of the navy. At its head is an admiral as chief. He issues all commands and administrative orders and, in particular, sees that the navy is provided with all necessary funds.

Comprising the Admiralty are (1) the admiralty staff, (2) the naval command office, (3) the naval general office, (4) the naval administrative office.



The admiralty staff consists of—

The officer personnel section, which has charge of all personnel matters relating to line officers and pay corps.

The engineer section which has charge of mechanical and scientific development.

The medical section which has charge of all matters pertaining to the health of the navy.

The budget section which has charge of the preparation of the budget for the navy and supervision over funds.

The naval command office has charge of all purely military matters such as: Organization, training, personnel, including care and maintenance, tactical and strategic matters, the use of weapons, etc.

The naval general office has charge of development of ordnance, hydrographic matters, dockyards, and sea transport.

The naval administrative office has charge of all administrative matters such as pay and allowances, subsistence, quarters, clothing, construction, etc.

Directly subordinate to the chief of the Marineleitung are the commander in chief of the naval forces afloat, the chief of the naval station (naval district) of the Baltic and the chief of the naval station (naval district) of the North Sea.

The naval forces afloat

The entire naval forces afloat are combined under the command of a flag officer who is the commander in chief, flagship *Schleswig-Holstein*, with headquarters at Wilhelmshaven. He is responsible for the readiness of all ship and torpedo boat formations under his command. He is at the same time chief of the battleship division.

Subordinate to the commander of the naval forces are the commander of the light forces of the Baltic and the commander of the light forces of the North Sea, under whose command the cruisers and torpedo craft of each station are united to form a "squadron of light forces."

The naval station headquarters

The naval station commandants are the senior naval authorities on shore. They are directly subordinate to the chief of the Marineleitung, and have their headquarters at Kiel and Wilhelmshaven respectively. The chief of a naval station is a flag officer.

The principal duties of the naval station headquarters are the direction of coast defense, military supervision over intelligence duty within their respective limits, direction, and supervision over the preparation and readiness of the necessary facilities and forces for defense. They are furthermore responsible for the training and activities of the naval organization afloat and ashore under their command and of the authorities, in particular the coast defense sections, as well as intelligence duty, personnel matters of officers belonging to the station, the recruiting of enlisted men and economic matters relating to the same.

Coast defense

Coast defense is based on the sea fortresses.

Subordinate to the chief of the Baltic station are:

First coast defense section at Swinemunde.
Third coast defense section at Kiel.
Fifth coast defense section at Pillau.

Subordinate to the chief of the North Sea station are:

Second coast defense section at Wilhelmshaven.
Four coast defense section at Cuxhaven.
Sixth coast defense section at Emden.

The coast defense forces are composed of 6 coast-defense battalions, 2 signal companies, and 2 training depots, divided equally between the two stations.

3. STRENGTH.

a. Personnel

Total permitted establishment, active list, officers and men, inclusive of administrative staffs ashore, shore establishments, schools, coast defense units, and signaling companies, 1,500 officers plus 13,500 men or a total of 15,000.

b. Ships

NORTH SEA STATION

Battleships

Schleswig-Holstein, flagship, in commission. 13,200 tons, 18 knots.
Hanover, in commission. 13,200 tons, 18 knots.
Schlesien, out of commission. 13,200 tons, 18 knots.

Reserve

Preussen, out of commission. 13,200 tons, 18 knots.

Cruisers

Hamburg, in commission (training service). 2,650 tons, 21 knots.
Amazone, in commission. 2,650 tons, 21 knots.
Arkona, out of commission. 2,700 tons, 21.5 knots.
Emden, in commission, but still attached to naval district. 6,000 tons, 29 knots.

BALTIC SEA STATION

Battleships

Elsass, in commission. 13,200 tons, 18 knots.
Hessen, in commission. 13,200 tons, 18 knots.
Braunschweig, out of commission. 13,200 tons, 18 knots.

Reserve

Lothringen, out of commission. 13,200 tons, 18 knots.

Cruisers

Nymphe, in commission. 2,650 tons, 21 knots.
Medusa, out of commission. 2,650 tons, 21 knots.
Berlin, in commission (training service). 3,250 tons, 22 knots.

NORTH SEA STATION—continued

Reserve

Niobe, in commission (training service). 2,650 tons, 21 knots.

Destroyers

T–196 (flotilla leader), in commission. 648 tons, 32.5 knots.

V 1, 2, 3, 5, 6, in commission. 570 tons, 32.5 knots.

Torpedo boats

T 151, 152, 153, 156, 157, 158, in commission. 554 tons, 30 knots.

Survey ship

Meteor, in commission. 1,150 tons, 14 knots.

BALTIC SEA STATION—continued

Reserve

Thetis, out of commission. 2,600 tons, 21 knots.

Destroyers

T–190 (flotilla leader), in commission. 648 tons, 32.5 knots.

G 7, 8, 10, 11, in commission. 564–570 tons, 32.5 knots.

S–18, in commission. 570 tons, 32.5 knots.

Torpedo boats

T 139, 141, 143, 146, 148, 149, in commission. 530 tons, 30 knots.

Survey ship

Panther, in commission. 1,000 tons. 14 knots.

Tenders and other auxiliaries not listed.

4. DISTRIBUTION

The fleet is stationed in home waters.

The cruiser *Hamburg* is making a training cruise to the Pacific.

The cruiser *Berlin* is making her winter practice cruise to South America.

The survey ship *Meteor* is on a scientific expedition in the South Atlantic.

5. EFFICIENCY

The reconstruction of the navy is progressing rapidly, both administratively and in the disposition of the staff and command. In the smartness of the ships and of the officers and men the German Navy seems to be on the same plane as before the war. No effort is spared at the schools to produce efficient officers or, in the shore establishments and training ships to promote the physical development and seamanlike knowledge of the men.

"Fully manned ships and empty garrisons" is the principle toward which all are working.

6. MERCHANT MARINE

	Number of vessels	Gross tonnage
Steamers and motor ships		
100 tons and upward	1,947	3,006,270
Less than 1,000 tons	1,268	476,361
Greater than 1,000 tons	679	2,529,909
Mercantile vessels placed in commission between June 30, 1925, and Jan. 1, 1926	13	62,378
Total greater than 1,000 tons	692	2,592,287
Vessels less than 12 knots	619	1,924,556
Vessels 12 to 16 knots	71	614,801
Vessels 17 to 20 knots	1	20,576
Vessels 20 knots and up	1	32,354
	692	2,592,287

7. NAVAL BUDGET

	Reichmarks
1924–25	104,300,000
1925–26	146,000,000
Proposed 1926–27	193,000,000

Notes on visit of cruiser "Berlin" to Rio Janeiro

The cruiser Berlin visited Rio Janeiro February 6–13, 1926.

Officers seem thoroughly alive to the mission before them, i. e., developing a highly efficient nucleus of personnel for future expansion in naval tonnage. They were interested in Bywaters article on "Germany and the navy" which points out that five years hence Germany, having been taken in now as an equal among nations, can justly claim equal opportunity and so support a demand for revision of the treaty limitations on tonnage. (With a seaborne commerce nearly equal to pre-war, superior to all allies but Great Britain and the United States, she can justly claim a need for a proportionate naval force.)

Officers would not visualize their ideas but it was apparent that the ideas of Bywater are paramount in their view of their present mission.

Though but 100 cadets are taken in yearly, there was dropped a hint that on the *Berlin* all of the cadets are not official cadets, i. e., there may be a number of extra students officially enlisted as enlisted men, but whose careers are to be officers eventually (when the time comes). A certain number of appointments to cadetships are given to enlisted men on board ship, and even at dances ashore the cadets wear regular blue jacket uniforms. Officers seem to recognize that there must be developed a closer understanding between them and the enlisted men.

The treaty allows 1,500 officers and 15,000 enlisted men. Enlistment is for 12 years, and each year the small make-up for new enlisted men is taken from 4,000 to 9,000 applicants thus permitting high-class selection.

The authorized cadets are selected each year from an average of 2,000 applicants. Service in the navy is apparently popular, and may be only on account of a guarantee career in the face of the economic situation, or it may be there is common understanding that the future looks bright.

A German on shore with friends aboard stated that discipline was more severe than before the war. My own observations indicate discipline is rigorous in a military sense, but rather ragged so far as regards appearance on vessels.

Men seem to do their work but display considerable spirit of independence in doing it.

Engineers are still in a separate corps, 20 of the 60 cadets on board are engineer cadets.

Cash allowance for upkeep of material appears restricted. Food on board for crew looked good. All men looked healthy and of extremely fine physique and all comparatively young.

All ships were said to be equipped with the latest fire control, and duty as gunnery officer is regarded as highly desirable.

Great regard is manifested for the contentment of the crew, such as clothing, food, recreation, and regular home port visits. The present system of mingling cadets with enlisted men (they wear same uniform, do same work as enlisted men, but mess separately) was said to be the result of criticism that officers before and during the war did not know their men well enough to secure real loyalty, results being obtained only through rigid discipline.

Guns on board the *Berlin* seemed in excellent condition, galley was clean, officers rooms were not. Crew spaces were clean but crowded. Hull preservation seemed good from a view of gun and main deck. Radio antennas are hung vertically, two from each mast. This differs from all known rigs.

An officer stated that the routine of the squadron based on Kiel provided for very active gunnery and fire-control training. He said that the navy was popular at home and no change in spirit from that known under the Emperor to what it is now. He said that the Republic was popular among the people, but not so much so among the officers of the navy, though the broader feeling of loyalty to the Fatherland remained unchanged. He knew of the coming cruise around the world of a German cruiser with cadets aboard and that the ship would visit Los Angeles. He spoke so accurately on this that it was felt he knew the cruise to have been planned to try out American contact in some locality judged suitable.

The naval academy for line cadets has been moved from Kiel, Kiel being used for engineering cadets only.

An officer of the *Berlin* was on the *Leipsic* from 1914 until she was sunk at Falkland. His observations were interesting, principally those affecting the decision to enter the Atlantic. He said wardroom gossip at the time thought the admiral planned to approach the African coast and raid shipping there. But failing to secure enough coal at a rendezvous planned before departure for that coast he, learning of a German collier some 450 miles from the Falklands, decided to intercept her and fill his needs under shelter of the Falklands.

Another tale of some interest is the statement by an officer that he in 1914 or 1915 was in Bankok [probably Amoy, if true.—Ed.], that there were several United States destroyers, among them the *Bainbridge*, and that he got on board that vessel and remained a stowaway under the captain's cabin from Bankok to Manila, and thence as an unrecognized German on a United States Army transport to San Francisco, working as one of the crew. He finally got to Germany via a Dutch ship, New York to Rotterdam.

One officer (one of the four officers saved from the *Leipsic*) said that after her ammunition was exhausted about 200 of her crew went up on deck after the *Glasgow* ceased firing, most of these being engineers who had suffered no casualties, no shells having pierced her armored deck: while on deck he said the *Glasgow* opened fire again (later explained by the captain that he saw a flash from the *Leipsic* and thought that she had reopened fire), and when she went down 5 officers and 28 men were alive. He said the captain had taken off his boots and waited aboard until the ship sank, but was caught in the suction as she went down.

The cruiser *Berlin* was not nearly as smart as similar types before the war, i. e., the *Leipsic* and *Nurenberg*.

Itinerary of cruiser "Hamburg"

	Arrive	Remain
St. Thomas	Mar. 27	About 16 days.
Colon	Apr. 16	About 2 days.
Panama	Apr. 20	Do.
San Jose (Guatemala)	Apr. 27	About 6 days.
La Union (San Salvador)	May 3	About 5 days.
Los Angeles	May 17	About 14 days.
San Francisco	June 1	About 8 days.
Honolulu	June 18	About 21 days.
Yokohama	July 23	About 11 days.

This ship is commanded by Captain Groos, author of the German Naval History, "Krieg zur See."

GERMANY

THE PROBLEM OF FOG IN PRACTICAL AIR NAVIGATION

[By Alfred Gymnich]

Air navigation, which since its beginning in 1920 has made the most undreamed of progress, has to-day practically reached its limit in point of reliability and punctuality of scheduled flights—it is only during the summer, perhaps, that a better record is attained.

In spite of all the brilliant results and progress, a regular winter air schedule is still impossible to-day—a condition that, along with other reasons, is due mainly to the ground fog encountered in the late autumn and also in winter during mild weather. This still represents the most implacable foe of air navigation.

The winter air schedule, which was partially put through this winter for the first time, was sufficient evidence that it is practically impossible to hold to a firm and fast schedule, especially in the early morning hours, as long as there is no way of overcoming the effect of the fog or reducing it to a minimum by the use of special instruments. However, punctuality and regularity are the natural provisos for any air service. The air passengers at this season will undoubtedly have experienced this, for many hours of futile waiting at the air port is no pleasure, quite apart from the loss of time involved.

In so far as special means are not employed on the flying field for the solution or scattering of the fog (for instance, the American attempt to disperse the clouds by strewing them with coarse sand), the following instruments are necessary when flying in and through fog and clouds:

An absolutely reliable inclinometer that permits constant control of the airplane's position without too much effort on the part of the pilot.

A direction instrument (compass, radio direction apparatus, etc.), which permits a strict holding of the flight course without diverting the pilot's attention from the steering, etc.

An altitude indicator that shows the altitude at any time within the fraction of a meter.

There is no such thing as an absolute sense of balance; that is, no pilot can attempt to hold his plane balanced without the assistance of the horizon, the sun, etc., as aid. He can estimate his position with relation to the axis of flight by several means; for instance, the speed indicator, the revolution gauge, the pressure in the cockpit, and the whistling of the wind in the wires, etc., but the feeling for the lateral position of the plane disappears after a few moments of flight in clouds or fog.

The ordinary fluid compass serves as an approximate but wholly unreliable aid for estimating the lateral position. For instance, if during a flight in the clouds the compass turns to the right, then the pilot knows that the plane has turned to the left, without, however, knowing anything regarding the amount of the turn or the extent of the tip. The pilot operates the rudder to bring the plane back again into a straightaway horizontal flight, but usually oversteering is the result—the plane makes S curves, still hangs to the side, and the compass begins to make the dreaded oscillations or revolutions, so that after a few moments the pilot has entirely lost a sense of the lateral position. Very often an attempt to cut through fog and cloud banks has ended in accidents.

All inclinometers in the form of pendulums, bubbles, and U tubes filled with colored liquids fail of the desired results, because in executing a curve in a regular inclined position they come to rest in the apparent vertical; that is, the bubble or the pendulum rests at zero as long as the lateral inclination corresponds to the centrifugal power arising in the curve. The bubble or the pendulum, therefore, shows whether the plane is balanced, but never indicates the degree of inclination to the horizon.

The Anschutz flying horizon is a really practical inclinometer, which, unfortunately, is not yet in general use in all air transport planes. In 1916 it was extensively used, especially in navy planes, and in its present form is as effective as the true horizon in navigating airplanes in fog and clouds. The basic principle of this instrument is the use of a rapidly revolving, cardanically suspended gyro with vertical axis. It is operated by an electric current of 333 periods, generated by a generator operated by a fan blade. The center of gravity of the gyro is several millimeters below the point of suspension, and the axis comes to rest like an ordinary pendulum, in vertical position. The axis of the revolving gyro, acting also in accordance with natural laws, comes to rest in the direction of the resultant of all the forces involved. While this happens in the fraction of a second in the case of a bubble or pendulum, it takes place so slowly with the rotating gyro as a result of its own oscillating period that the horizon is practically independent of lateral accelerating forces. If the airplane is describing small circles, the centrifugal forces are distributed over the circle and offset each other; if, however, a large circle is described, then the accelerating forces remain too slight to have any marked effect on the gyro. Since the horizon disk, which is connected with the outer gudgeon, only indicates the inclined position of the plane, a level has been placed on the instrument to control the horizontal position. This level consists of a circular glass tube half filled with a colored liquid. The indicator is arranged to show the direction of the true and apparent

vertical on one and the same division of the scale. The difference in the indications of the gyro horizon and the bubble show the pilot the plane's position. It shows him whether the plane is flying straightaway horizontal or in a curve—what its inclination is to the horizon, and whether this inclination conforms to the radius of the curve or the centrifugal force.

By means of the Anschutz flying horizon, the pilot can steer his plane in clouds and fog as though he were estimating his position by the true horizon. He only needs to refer to the compass every two minutes in order to rectify the slight deviations in course. The compass will also work more exactly as a result of the quiet flight and will not begin to oscillate. The much feared turning of the compass when flying through clouds, can never occur.

Inasmuch as radio direction finding from airplanes has not produced any practical results, the fluid compass is temporarily the only instrument at hand and has proven indispensable to navigation owing to its many advantages. However, the ordinary fluid compass has many disadvantages. Since it must be located within sight of the pilot, in far the majority of cases it has to be installed in a place that is unfavorable in a magnetic way. A further disadvantage lies in its small size and the indistinctness of the rose card, as well as the amount of thinking it entails, since the course is guided by the rose, although the pilot's attention is already sorely taxed by the supervision of all the other instrumnets, and not least of all by the flight itself. The bell or ball compass (Askania Werke Ludolph A. G.) makes correct steering much easier owing to the much more distinct rose card, but nevertheless both these instruments must also be installed where they can be easily seen.

The distant reading compass of the Askania Werke avoids all the disadvantages of the ordinary fluid compass, and at the same time has the following advantages:

The actual compass itself is invisible and can be installed in a magnetically favorable place (for instance at the rear of the fuselage) which dispenses with the necessity of any compensation. The indications are wonderfully exact and reliable and at the same time the compass is protected from any detrimental influences. The indicating device which is nonsensitive to magnetic influences and is located just in front of the pilot, simplifies navigation considerably. The compass course is calculated before the flight on a special course marker, fitted with a rose card, so that in following the correct course, the indicator always remains at zero. The steering of the compass course is therefore tremendously simplified as the pilot only has to steer so as to keep the indicator continuously pointing to zero. The course is therefore held by a purely mechanical indicator (nonsensitive to magnetic influences) operating on a scale im-

mediately in front of the pilot and showing the deviations in course. Any alterations in course becoming necessary during the flight can be set on the course indicator during the flight.

The simplicity of operation of this instrument relieves the pilot quite materially and assures holding to the course under all circumstances.

All existing altitude barometers rest on the principle of the aneroid barometer, based on the different distentions of thin-walled vacuum metal capsules, varying with the air pressure (the air pressure decreases with the altitude). The barometric altitude barometer only shows the altitude above the sea level, or the altitude above a certain point, and not the varying altitudes during a cross-country flight. Furthermore the indications of such an altitude barometer are greatly influenced by variations in air pressure owing to differences in temperature. During ground fog, at night, etc., the barometric altitude barometer is absolutely useless as a landing aid, and landings in a fog therefore always end in disaster. These difficulties were only overcome with the introduction of the outer-barometric altitude barometer which shows the actual altitude at any time within the fraction of a meter.

This problem has been solved by Professor Behm, the inventor of the Behm echo sounding apparatus. The Behm aero sounder works on acoustic principles as the other. This instrument was given a practical trial on board the *ZR–III* and proved its great value. The echo sounding apparatus for airplanes which has been developed by Behm in the meantime has demonstrated in the tests conducted by the *DVL* that the problem has now found a practical solution. The soundings are taken automatically every half second but it is quite immaterial in what rhythm the sound waves are sent out. As the greatest exactness is imperative at the moment of landing, a change in the velocity of the sound through the temperature can have no practical effect on the indications, as an error of 5 per cent at an altitude of 1 to 2 meters can not affect the safety of the landing. At the present time, the Behm aero sounder is being subjected to some technical alterations which have nothing to do with the basic principle but are simply concerned with making the instrument conform to the other aeronautical instruments in size and simplicity of indication.

These three instruments increase the factor of safety and the plane's independence of weather conditions and thus are a long step on the way to a high-strata air service. Even though the dangers incident to fog have not been definitely overcome, nevertheless a local ground fog or low-lying clouds or layers of vapor are no longer a hindrance to the carrying out of scheduled flights; the danger of an emergency landing in a fog has been very greatly decreased.

One thing to be desired is the installation of an acoustic tachometer showing the correct flight velocity by its tones and therefore relieving the pilot's eyes in flying in fog and clouds which make necessary the very closest attention to the inclinometer.

The *DVL* made the following report regarding the Behm tests: The first tests with the aero sounder were carried out by Behm on the *ZR–III*. At that time he used a slightly modified water sounding apparatus. His systematic tests with an aero sounder for airplanes date from the beginning of 1925. At that time he demonstrated an apparatus in his laboratory at Kiel to Doctor Koppe and Doctor Genthe of the *DVL*, with which it was possible to make soundings at distances of 10 centimeters. This instrument consisted of a sound generator, a sound receiver, an echo receiver, a sound indicator and a light indicator. A detonation was used as sound signal—microphones were used as receivers. The indicator was a short-time gauge.

In the further development of the instrument, it was adapted for use in airplanes. After a number of preliminary tests, the *DVL* succeeded in carrying out a number of soundings in a Junkers *F–13* plane, from an altitude of about 60 meters down to the ground. The results conformed well with personal calculations.

The tests showed the necessity of protecting the echo sender from the sound sender. In an airplane, this protection is effected largely by the fuselage.

The instrument's indications are easy to read. No landing tests have yet been made with the Behm instrument but it is being developed along these lines.

GREAT BRITAIN

MISCELLANEOUS NOTES

Reported Movements of Mediterranean Fleet.

[From a consular report]

It is understood that every available ship of the Mediterranean Fleet, under the command of Admiral Sir Roger Keyes, Bart., will be leaving Malta on or about the 23d of February to carry out combined maneuvers with the Atlantic Fleet off Pollensa, and that the Mediterranean Fleet will return to Malta about the 20th of March.

According to the Atlantic Fleet's program, the two fleets will be engaged in exercises between the 5th and 8th of March after which they will disperse.

These will be the last maneuvers before the reorganization of the two fleets. The four *Iron Dukes* now composing the Third Battle Squadron in the Mediterranean will join the Atlantic Fleet, whilst

the battleships *Resolution* and *Royal Oak* now forming part of the Second Battle Squadron, Atlantic Fleet, will join the Mediterranean Fleet.

Italy—Policy—British experiments in radio maneuvering

The Italian press reports that Great Britain is going to make secret experiments at Malta on maneuvering ships by radio. Three old battleships will be used for this purpose. They will be subject to fire from the port guns while being maneuvered by radio from a shore station. Thus it will be possible to effect a double experiment. No further details are said to be available, on account of the great secrecy of the experiments.

[From the British press]

H. M. S. "Emerald" for the East Indies

Capt. W. B. Mackenzie at Chatham, January 15, commissioned the new cruiser *Emerald* for service on the East Indies station, where she is to relieve the cruiser *Colombo*, Capt. H. T. England, which is to return to England to pay off. The *Emerald* has been seven years under construction. She was laid down at the works of Sir W. G. Armstrong, Whitworth & Co., at Newcastle-on-Tyne in September, 1918, and, after launching, was towed from the Tyne to Chatham dockyard to be completed at leisure. Her cost amounts to nearly £1,500,000. With engines of 80,000 horsepower she is capable of steaming 33 knots.

Captain Mackenzie will command the *Colombo* on her voyage home.

H. M. S. "Wolfhound" cuts schooner in two

The British destroyer *Wolfhound*, on January 13, came into collision in the channel with the schooner *Miarka*, of Paimpol, cutting her in two. The warship picked up the six men of the crew and has landed them at Brest.

Aircraft carriers "Glorious" and "Courageous"

Owing to the closing of Rosyth dockyard the conversion of the cruiser *Glorious* into an aircraft carrier is to be carried out at Devonport. The *Courageous*, which is a sister ship of the *Glorious*, is already undergoing conversion at Devonport, and the amount to be spent upon her during the financial year, which closes at the end of next month, is estimated at £468,751, of which no less than £260,000 is appropriated for labor. The fact that over 50 per cent of the total

sum spent on the ship in a year goes direct to the employees shows the importance of reconstruction work to the yard and the community generally.

H. M. S. "Cumberland" to be launched

The cruiser *Cumberland*, building at the works of Messrs. Vickers (Ltd.), at Barrow-in-Furness, will be launched on March 16, the same day as her sister ship at Chatham, the *Kent*. The Dowager Countess of Carlisle will perform the naming ceremony.

The *Berwick*, building at the Fairfield yard, Govan, is now the only cruiser of the 1924 program whose launching date has not been announced.

Launching of H. M. S. "Amazon"

Messrs. John I. Thornycroft successfully launched at Southampton on January 27 the torpedo-boat destroyer *Amazon*, which, it will be recalled, stuck fast on the ways a few days earlier after she had been named by Lady Chatfield, wife of the third sea lord. At the second attempt there was not the slightest hitch; indeed, the vessel was floated in a few seconds.

The *Amazon* is regarded as the most advanced type of torpedo-boat destroyer ever built, and a comparison with a former *Amazon* launched by the same firm in 1908 indicates the enormous developments that have been made in this type of vessel. In the earlier *Amazon*, which was a great advance on previous vessels of the same type, the officers' baths were simply circular india rubber things suspended from the deck, whereas in the new vessel the officers have full-length baths of the usual type used ashore. The commander of the old *Amazon* was allotted one solitary cabin, whereas in the new one he will have a sleeping cabin, a sea cabin, and a day cabin, the increased responsibilities and modern scientific instruments necessitating the enlargement.

The crew's quarters also show a vast improvement. The recreation room, sick bay, bath spaces, etc., are features that were lacking in the old *Amazon*. In the new vessel the charthouse, steering arrangements, and captain's sea cabin are arranged on the bridge, and the destroyer can be navigated without the exposure imposed by the arrangements in the first *Amazon*.

The Singapore floating dock

Considerable interest attaches to the recent announcements that the Admiralty are calling for tenders for a floating dock to be placed

at Singapore. This will be welcome news not only to the unemployed labor in the shipbuilding trade but also to those who have the ultimate welfare of their country at heart. There is no difference of opinion among those who have really studied the subject that it would be quite impossible for this country to carry on a successful naval war in the Far East with fleets based upon arsenals in Great Britain, and we welcome this addition to our naval resources in eastern waters. That a naval base must be as close as possible to the seat of naval operations was well understood and acted on in the very early days of the Great War. As far as possible a Portsmouth was created in the north of Scotland, and floating workshops, floating docks, storeships, and all other necessities for the well-being of a fleet were assembled as closely as possible to the anticipated scene of naval activities. The German Admiralty adopted exactly the same course of action on their side of the North Sea.

[From consular reports]

AVIATION NOTES

New airplane engine

The Royal Aircraft Establishment at Farnborough has recently been experimenting with a new airplane engine which has no sparking plugs, magneto, coil or high-tension leads. The ignition is brought about by the compression of heavy oil, which is injected by special apparatus into the cylinder, and is subjected to a pressure sufficient to ignite it.

Because of the absence of the component parts of an electrically fired engine, this new model, it is claimed, will be cheaper to build and, since it uses a heavy oil rather than gasoline, will be much cheaper to run. From the meager accounts, it is learned that ground tests have been made with the engine and in a short time it is to be tested in the air. Great secrecy is being maintained by the R. A. C. in regard to both the construction and the trials of the engine.

British air-cooled engines

Perhaps one of the most remarkable developments in aviation has been the rise in popularity and the rapid development of the radial air-cooled engine. Pioneering in this work has been the Bristol Aeroplane Co. (Ltd.), Filton, Bristol, which concern has built the famous Cherub and Jupiter air-cooled engines. As this engine was installed in the Powell racer, which won three prizes in open events of the light-plane class at the recent New York air races, it will probably not be necessary to enter into a detailed discussion of the construction of the engine.

It is interesting to note, however, that the French Government has recently placed an order for 220 Jupiters and the French Navy for 150, thus bringing the total ordered this year to 370 engines. Poland ordered 114 engines. In Holland Fokkers are installing Jupiter engines in some of the military planes which they are building.

It is claimed by the Bristol Co. that their engine, the Jupiter, is looked upon as standard air-cooled engine equipment in no less than 13 countries.

American engines make fastest bomber

As might be expected, the placing of an order for Curtis engines by the Fairey Aviation Co. (Ltd.), has caused considerable newspaper comment in this country. The air ministry has been made the target for adverse criticism, but this department of the Government has not yet seen fit to answer its critics. On the other hand, there have been those who have warmly defended the purchase of these engines, stating that it was to Britain's best interest to have the fastest bombers possible, and that, if enough engines could not be secured in this country, it is to their own advantage to get them, regardless of where they were purchased.

Commenting upon this purchase, "Airways" for December, 1925, says: "The world's fastest bomber is the new Fairey *Fox*, with which the squadron of the Royal Air Force is to be equipped. Driven by an American D–12 engine and fitted with a Reid duralumin air screw" (also American) "the machine is faster than any two-seater fighter. It is also 20 miles an hour faster than any single-seater in the Royal Air Force."

Radio press service to India

The Civil and Military Gazette, newspaper, of Lahore, Punjab, India, announces, in its issue of January 4, current, the inauguration on that date of a British radio news service of messages received from Great Britain's new station at Rugby. Commenting on this achievement the Gazette observes, editorially:

> For some years we have been receiving wireless messages from Leafield, near Oxford, but these were very intermittent during bad weather. The service on the new Rugby station was inaugurated while Great Britain was experiencing one of the greatest storms of recent years, yet the Indian station at Jutogh near Simla presumably had no difficulty in receiving messages which included many proper names and initials. The importance of this achievement from an imperial point of view can hardly be overstated and it speaks volumes for the efficiency of British wireless engineers that Rugby should have been called upon to function at a time of great atmospherical disturbance and yet was not found wanting.

GREECE

PROGRESS OF SUBMARINE CONSTRUCTION

The following is the status of submarines for the Greek Navy being built in French yards:

Two submarines, 600 tons (no mines), building at Chantier de Loire, St. Nazaire, to be completed summer 1926.

Three submarines, 700 tons (no mines); two at Chantiers de Loire, St. Nazaire; one at Chantier Navale Francais de Caen.

ITALY

PROGRESS OF NAVAL CONSTRUCTION

The following information is believed to be reliable:

Ships under construction as of December 1, 1925

Type and name	Shipyard	Per cent completed	Date of completion
Light cruisers:			
Trento	Orlando, Livorno	17	Indefinite.
Trieste	Stabilimento Tecnico, Triestino, Trieste	10	Do.
Destroyers:			
Q. Sella	Pattison, Napoli	99	First half of 1926.
B. Ricasoli	do	96	Do.
G. Nicotera	do	82	Indefinite.
F. Crispi	do	98	First half of 1926.
N. Sauro	Odero, S. Ponente	81	Do.
D. Manin	Cant. del Quarnaro, Fiume	87	Do.
C. Battisti	Odero, S. Ponente	66	Do.
F. Nullo	Cant. del Quarnaro Fiume	72	Do.
Turbine	Odero, S. Ponente	25	Second half of 1926.
Aquilone	do	23	Do.
Nembo	Esercizi Bacini, Genova	33	Do.
Euro	do	31	Do.
Borea	do	38	Do.
Zeffiro	do	31	Do.
Espero	Ansaldo, S. Ponente	26	Second half of 1927.
Ostro	do	24	Do.
Submarines:			
Balilla	Ansaldo S. Giorgio, Spezia	50	First half of 1926.
E. Toti	do	42	Second half of 1926.
D. Millelire	do	44	Do.
A. Sciesa	do	Laid down	Indefinite.
V. Pisani	Cant. Nav. Monfalcone, Trieste	do	Second half of 1926.
M. Colonna	do	do	Do.
G. Bausan	do	To be laid down.	Do.
Des Geneys	do	do	First half of 1927.
Masaniello	Tosi, Taranto	Laid down	Second half of 1926.
Pier Capponi	do	do	Do.
G. Da Procida	do	do	Do.
Tito Speri	do	do	First half of 1927.
Mine layers:			
Buccari	R. Cant. Castellammare	32	Indefinite.
Durazzo	do	17	Do.
Pelagosa	do	57	Second quarter of 1926.
Milazzo	Cant. Navale Triestino, Monfalcone	50	First half of 1926.
Dardanelli	do	50	Second half of 1926.
Ostia	do	35	Do.
Azio	Cant. Navale Riuniti Ancona	50	First half of 1926.
Legnano	do	70	Second half of 1926.
Lepanto	do	45	Do.
Auxiliaries:			
G. Miraglia	Royal Arsenal, Spezia	86	Indefinite.
Quarnaro	Cant. Navali Scoglio Olivi	86	March, 1926.
Patria	R. Cant. Castellammare	To be laid down.	Indefinite.
Tarvisio	do	80	June, 1926.

Notes on destroyers "Manin" and "Nullo."

These two destroyers are under construction at the Cantiere del Quarnaro, Fiume. They will, when completed, have a full load displacement of 1,300 tons, metric, their overall length is about 300 feet with a maximum beam of about 32 feet and a draft of about 14 feet. Their full speed is expected to be 37 knots with a cruising speed of 18 to 20 knots, and their complement 5 officers, 14 chief petty officers, and 148 men. They will carry 4.8-inch guns in twin mounts (12 centimeters) aft and two tripple-tube torpedo mounts on the midship line. Gun mounts for three 3 centimeter antiaircraft guns were seen, two amidships and one on the fan tail.

The construction of these ships seems to be extremely light. No plating greater than ¼-inch being used anywhere and in many places, interior bulkheads, etc., plating very much lighter is used. The rivets used in construction are of a size corresponding to the thickness of the plating—the opening between rivets, however, is so small that the plates are practically caulked when riveted. The yard manager, when asked about this point, said that greater elasticity and more satisfactory performance was obtained by using smaller rivets at closer intervals than by using larger rivets at relatively the same spacing that is in rivet diameters. The gun foundations were rather solid looking hollow trunks about 3 feet in diameter and it was stated they were also ammunition hoists. The destroyers have forecastle deck 5 meters high running all the way back to the forward stack. The foremast is just forward of this and is abaft the charthouse—bridge and emergency cabins. The second stock is only about two-thirds the height of the first. Between the two stacks and extending slightly abaft No. 2 stack is what seems to be the boiler uptakes. The boilers—three in number are so big that the steam drums come up to the main deck—the uptakes are in consequence exposed and take up a lot of room on the main deck. Forming a sort of extension of these come the engine room hatches. Aft there is a small deck house inclosing the hatch to the wardroom country.

The underwater body aft is cut away considerably to accomplish two purposes. The first is better speed and less squatting at high speeds and the second is that this construction gives a better and steadier gun platform. The disadvantage of weakness in construction is apparently not considered serious although the yard manager in discussing the point said the boats would not be able to stand any rough weather and that the pounding of even a moderate swell would not only make the officers quarters uninhabitable but that it would also have a more serious effect on the alignment of the turbines.

The crews quarters are all forward, one large compartment equipped with lockers and billet hooks for hammocks on the main deck is duplicated on the deck below. The chief petty officers have three compartments provided with bunks and lockers. These are also in the forward part of the ship as are the galleys, crews heads, and showers. The officers' quarters aft are roomy and very comfortable looking—each officer has a large room to himself. The captain has his own cabin, stateroom, and bath.

The arrangement of the magazines and fuel-oil tanks with reference to the firerooms would seem to be unsatisfactory as the forward magazine is between the forward fireroom and the last of the seven forward fuel-oil tanks. A small cofferdam is supposed to separate the fireroom and this magazine but it hardly seems big enough to serve its purpose effectively. The other fuel-oil tanks are along the hull in the engine rooms—abaft the engine room and under them. The total fuel-oil capacity is 200 metric tons.

The engines are a combination of impulse and reaction turbines fitted with double reduction gears. The HP turbines are impulse and the IP and LP reaction. There are two engine rooms, each independent of the other and separated by water-tight athwartship bulkhead.

The engines are rated at 35,000 horsepower giving a power of about 28 horsepower per cubic meter of water displaced. The engines of the *Manin* were built by the Ansaldo Co., Genoa—the boilers of both ships were built by the yard. They look very much like curved tube Yarrow boilers slightly larger than American destroyer boilers and are equipped with 12 burners.

For auxiliary lighting, heating, and water service electric power is used. For this purpose a hot bulk IC engine driven dynamo is installed.

On 29 January, 1925, the destroyer *Ricasoli* was successfully launched at the Pattison yards, Naples.

In accordance with Royal Decree No. 2163, dated November 29, 1925, the transport *Bengasi* (ex-*Derna*, captured from Turkey, 1911) and the torpedo boat *Rismondo* were stricken from the list.

ITALY

AVIATION NOTES

Enlisted pilots

In response to an inquiry as to whether or not enlisted pilots are as satisfactory as officer pilots, the Italian Air Ministry states that

there can be no preference as between officer and N. C. O. pilots, since their duties are of entirely different natures. N. C. O. pilots are assigned to the squadrons only, and in addition to piloting perform duties of a disciplinary and technical nature. However, it is the intention of the Royal Air Service to use as many enlisted pilots as possible. Squadron and smaller unit leaders and deputy leaders will, as a rule, be officers, while all other pilots will be N. C. O's.

In the squadrons at present there are about two N. C. O. pilots to one officer pilot. In the Royal Air Service there are approximately 394 officer pilots, 230 complementary officer pilots (similar to our reserve), and 415 enlisted pilots. Under instruction there are 13 officers, 186 complementary officers, and 138 enlisted men. These figures are as of August 10, 1925, but there has been slight change since then.

N. C. O. officer pilots are obtained from N. C. O. or enlisted men of the Royal Air Service, other arms, or civil life. Enlisted men voluntarily applying for flying training must have had at least a grammar-school education, must be physically fit, and be between 18 and 25 years of age. Prospective N. C. O. pilots must enlist for a period of 4 or 6 years, as they desire. Should a student pilot prove unfit during instruction, he is sent back to his corps of origin or to civil life, and the 4 or 6 year enlistment canceled. Men who successfully complete their flying instruction may at the end of their enlistment be discharged or continue on in the service until 52 years of age. The minimum length of service with which they may retire is 20 years. Enlisted pilots who, after a period of years, become unfit for flying, may be used for various duties about the squadrons. However, there is no definite policy on their use at present.

In order to obtain the pilot's brevet it is necessary to complete the prescribed course of instruction. However, an officer, enlisted man, or civilian who has, on his own, successfully completed a course of flying instruction at one of the schools in Italy or abroad, may, on successfully passing the required flying and physical examinations, be given the pilot brevet.

The Italian press reports that Czechoslovakia has adopted the Avorio Prassone Italian captive balloon for artillery observation.

The Avorio Prassone observation balloon, built by the Aerostatica Ala, an Italian company of recent formation, was adopted after competitive tests with the Continental Co., Germany; Semperit, Austria; and Bureau Central de l'Air, France. Its selection was based not so much on cost as on its superiority and recognized worth.

This type of balloon having been used during the war by England, Belgium, Japan, Spain, Argentina, and the United States.

Whether or not an order for these balloons has been actually placed or not is not known.

It has been ascertained that the Italian aviation budget for the year 1926-27 which has been approved by the council of ministers and will be presented to Parliament in the near future, contains a total of 629,000,000 lire. This total is tentatively divided into the following subheads:

	Per cent
For new aircraft and general material	53.3
For general operating expenses	22.99
Pay and allowances of military personnel	22.02
Pay and allowances of civil personnel	3.69

NOTE.—Of the 53.3 per cent for new aircraft and material, 20,000,000 lire is for arms, bombs, explosives, and pyrotechnics.

It will be noted that the budget of 629,000,000 lire may be increased from time to time during the year; just as the original budget of 449,000,000 lire for the year 1925-26 has already been increased by 90,000,000 and by 10,000,000 lire.

ITALY

POLITICAL NOTES

Control of political opinions of State officials

The following bill, relative to the dismissal of State officials and civil and military employees for political opinions not in agreement with the present Government's policy, was recently passed by the Chamber and the Senate and is now in force:

1. Up to December 31, 1926, the Government is empowered to dismiss (even outside the cases provided by the existing laws) officials, employees, and agents of all orders and grades, both civil and military, under any State administration, who, by means of words or actions in their offices or outside, do not give assurance of loyal service, or place themselves in opposition to the policy of the Government.

This dismissal is effected by royal decree, under suggestion of the competent minister.

In case of officials or officers of the army, navy and air service, whose grade is above the sixth (the sixth grade in the Italian Navy being that of captain) or of magistrates or fixed professors of the royal universities, a decision of the council of ministers is necessary.

2. Officials or employees dismissed as per paragraph 1 will receive the pension due to them according to the existing laws. The number of years of service necessary for the granting of a pension is, however, reduced to

15. Employees who have served less than 15 years will receive an indemnity equal to as many twelfth parts of their yearly salary as the years of service.

3. Against the dismissal as per paragraph 1 appeal is allowed only on the basis of incompetence or violation of law; and to the council of state, or, in extraordinary cases, to the King.

Naval personnel and secret associations

In accordance with the law against state employees' membership of secret associations, all employees of state administrations are required to declare whether they have ever belonged to any association (especially freemasonry) whose members are in any way bound by secrecy. The following is a translation of the circular of the Minister of Marine relating thereto:

In accordance with the law against secret associations, all officials and civil personnel in the State administrations are to declare whether they have belonged or belong at present to associations or institutes established in the Kingdom or abroad which operate, even in part, secretly or clandestinely, or which impose secrecy in any way upon their members.

This ministry relies upon the high feeling of loyalty of the Italian officer and the civil personnel in the administration of the navy for a sincere statement from everyone concerned upon these points. No fear must be entertained of sanctions or consequences which will not be taken except against those who, having once fallen in error, still mean to persist in it. All statements will be confidential and will not be included in the personal records.

The written statement, which every officer or civil servant will sign on his honor, will include the following information:

1. Rank, name, corps, vessel, department, or service.

2. Whether the writer has belonged to any secret association, and if so, to which (with special reference to freemasonry, and to which kind of freemasonry); together with the date when the writer has ceased to belong to it.

3. Whether the writer belongs at present to any such association, and if so, to which (as above).

4. In case of an affirmative answer to the second question and a negative answer to the third, the writer will state whether he obligates himself to never enter again the association he has left or others of the same kind, and to never take an interest in any way in the field of activity of such associations.

Every officer, official, or civil servant will enter his statement on a special form which he will receive and tender in a sealed envelope to his immediate superior. On the envelope the information on rank, name, and station will be repeated with a typewriter, if available.

These instructions apply to chiefs of first, second, and third category and to assistant chiefs.

The statements will be collected by the naval commands and forwarded to the cabinet of the Ministry of Marine not later than February 10, 1926. Only in the case of ships abroad the statements will be accepted later.

On January 3, 1926, the King appointed Signor Mussolini Prime Minister, Minister of Foreign Affairs, of War, of Marine, and of Aeronautics. Formerly Signor Mussolini held the Military Ministries only *ad interim*.

JAPAN

NAVAL NOTES

Airplane carrier "Kaga"

A view of the *Kaga* was recently had at Yokosuka Navy Yard. The *Kaga* is still in a very incomplete state of construction and it is not believed that she can be completed prior to July, 1927. The *Kaga* at present is so high in the water that about 3 feet of her very pronounced bulge could be seen. Immediately above the upper limit of the bulge was seen the wood backing for her armor belt. At present this wood backing extends to within 30 feet of the stem and stern and is about 12 to 15 feet wide. It is noted that according to information available concerning the characteristics of the *Kaga* when building as a battleship, that the armor belt was stated to stop at about 220 feet from the stem. Apparently therefore the armor belt has been considerably lengthened.

On the deck just below the main deck are six openings on each side of the ship which closely resembled gun sponsons for secondary battery guns and were stated to be 8-inch gun sponsons. The last of these openings was about 60 feet from the stern and they were about 15 feet apart. Apparently these openings are not intended as 8-inch gun sponsons since the *Kaga* is limited to ten 8-inch guns. Nor does it seem likely that these are the original sponsons for the 5.5-inch guns of the *Kaga* when designed as a battleship, since the *Kaga* was originally intended to have twenty 5.5-inch guns and as many as 12 of these guns would not be located so far aft. The possibility is suggested that these openings will be used as the exits for the exhaust gas funnels.

Another peculiarity of the *Kaga's* design is that a sloping deck is at present being constructed from the main deck near the stern and rising forward to one deck level higher. The purpose of this deck is not understood but it was stated it was to be a flying-on deck. It was also stated that the *Kaga* was to use the same turbine engines that were intended to be used for the *Kaga* as a battleship.

Cruiser "Myoko"

The 10,000-ton cruiser *Myoko* was seen undergoing construction at the Yokosuka Navy Yard.

The *Myoko* is in the early stages of construction.

The *Myoko* is to have a clipper bow.

Only two propeller struts were laid out aft.

The *Myoko* appears very long for her beam.

A few armor plates were seen near the *Myoko* but none were over 3 inches thick.

It was stated (1) that the *Myoko* was to be equipped with 12 oil boilers some of which would also be fitted for burning coal. (2) That the engines were to be the Japanese Navy type turbines having both Curtis and Parson type features. (3) That the *Myoko* would be fitted with outer bulge.

Four special service ships to be placed in fourth reserve

According to the Japanese press, the special service ships *Tsurugizaki*, *Nozaki* (?) (probably the *Nojima*), and *Ondo* attached to Kure Naval Station and the *Mamiya* at present attached to the fleet will be placed in the fourth reserve on February 1, 1926, and will be tied up in Kure.

While in fourth reserve only a small part of the regular complement will be assigned to each ship to act as ship keepers.

Lack of funds is the reason given for the placing of the above ships in fourth reserve.

Orders placed for construction of submarine

According to the Japanese press, orders have been placed with the Kure Navy Yard to construct a large type submarine similar to the *I–53* and *I–55* type.

This submarine is to be constructed under the 1926–27 appropriation.

Submarine "Ro–52" to undergo repairs

According to the Japanese press, submarine *Ro–52* (old No. 26) which sank in Kure Harbor in October, 1923, was later raised and since then has been tied up in Kure, will undergo thorough repairs.

Submarine salvage method

The following information supplements that given on pp. 52, 53, January, 1926, BULLETIN.

The method in general consists in applying a counterweight in such a way that it will exert a lifting force approximately equal to the dead weight of the sunken submarine.

The *Asahi*, a ship of 14,765 tons displacement is equipped as a submarine salvage ship as follows:

Two heavy built-up stationary booms on each side of the ship. These booms project out about 15 feet from the side of the ship and are about 100 feet apart, fore and aft. At the outer end of each boom is a fixed sixfold block with metal sheaves. Also secured to the end of each boom and hanging underneath the boom block are six fourfold fixed metal blocks. These, together with six similar free blocks, form six fourfold purchases. In pairs, these free blocks are shackled to a special fitting (Sketch No. 2) which is designed to engage with a special pin (Sketch No. 3) secured to the pressure hull of a submarine used as a counterweight on the opposite side of the *Asahi*. On each submarine are permanently fitted six of these special pins, three forward and three aft. The distance between the forward and aft groups of pins being the same as between the booms of the *Asahi*.

The ends of six 2½-inch wire ropes are made fast to the lower free blocks, after each wire has been rove through each block of its own purchase, over the corresponding sheave of the fixed block of the boom and around a winch arrangement amidships on the deck of the *Asahi*. Power is applied to the winch by six 5-ton electric motors through gearing. The winch is also fitted with braking gear.

Sketch No. 1 shows general arrangement.

To the upper end of each special pin is secured a 1½-inch wire. At the other end of this wire is a buoy. The wire and buoy are stowed in a compartment in the upper deck of the submarine. The buoy may be released from inside the pressure hull or from the outside by a diver. When the buoy is released the wire is carried to the surface and the buoy detached. The end of wire is then passed through the special fitting (Sketch No. 2). The special fitting is lowered, and, guided by the wire, engages with the special pin on the submarine. When all pins have thus been engaged on both submarines, the operation of raising the submarine is commenced.

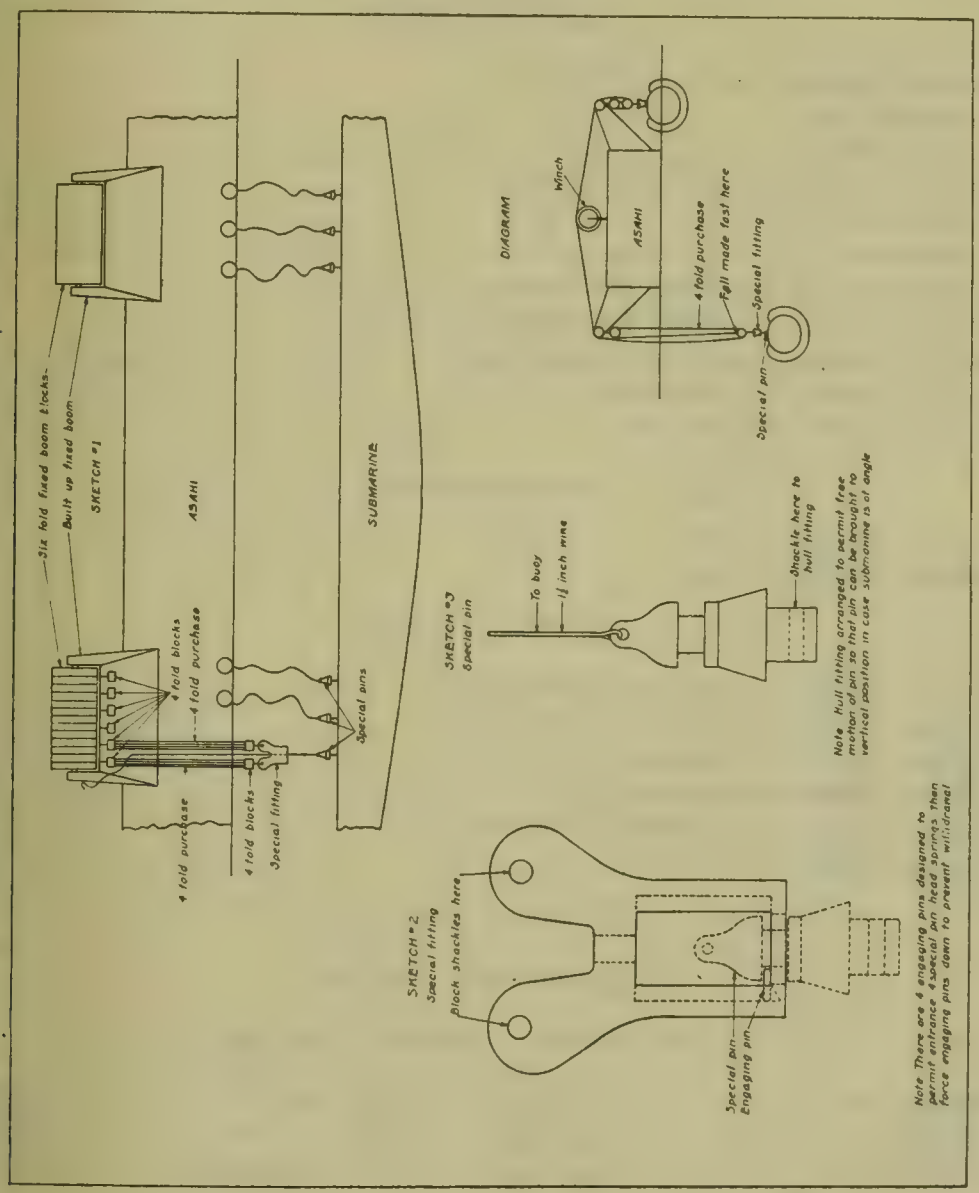
The counterweight submarine being on the surface, sufficient water is admitted to this submarine until the weight of each submarine is approximately the same. Variations in weight are taken care of by the winch. The winch is operated and the sunken submarine is raised to the surface.

It appears that a maximum lifting force of 240 tons can be applied by the winch, the power ratio of each purchase being 8 to 1, disregarding friction.

During the tests conducted by the *Asahi* in 27 fathoms, an ex-German submarine with submerged weight of 500 tons was raised using a Japanese submarine as counterweight. The submerged weight of

the counterweight submarine was 400 tons, the winch having taken care of the excess 100 tons.

The advantages of this salvage method appear to be many and result primarily from the fact that the services of a diver are not needed except possibly to release the buoys in the deck of the sunken submarine.



Number of enlisted men to be accepted at the various training schools during 1926

The following list shows the number of enlisted men to be accepted at the various training schools during the year 1926:

Gunnery school

Advanced gunnery training course	360
Regular gunnery training course	700
Range-finder training course	130

Torpedo school

Advanced torpedo training course (fish torpedo)	220
Advanced torpedo training course (electricity)	75
Ordinary torpedo training course	490
Advanced training course in wireless	85
Ordinary training course in wireless	300

Engineering school

Advanced training course on engines:	
Engine room	100
Fireroom	110
Ordinary training course on engines:	
Engine room	480
Fireroom	280
Advanced course, electrical engineering	75
Ordinary course, electrical engineering	170
Advanced training course on engineering	10
Training course on engineering	240
Training course shipwrights	51

Paymaster school

Advanced training course	55
Ordinary training course	95

Submarine school

Training course on torpedoes (advanced)	78
Training course on torpedoes (ordinary)	77
Training course in wireless	62
Training course on engines	140
Training course on electrical engineering	125
Training course for machinists	12

Japanese oil situation

Annual domestic production crude oil

Calendar year:	Tons	Calendar year:	Tons
1920	307,400	1923	250,400
1921	311,500	1924	245,300
1922	285,700	1925 (estimated)	240,000

Annual importations (exclusive navy), miscellaneous oils

Calendar year:	Tons	Calendar year:	Tons
1922	75,550	1924	256,600
1923	157,060	1925 (estimated)	400,000

Annual domestic consumption, miscellaneous oils

Calendar year:	Tons	Calendar year:	Tons
1922	361,250	1924	501,900
1923	407,460	1925 (estimated)	640,000

Imports of fuel oil for navy use, calendar year 1925

	Tons
From California	117,500
Tarakan, January to June	105,000
Singapore, January to July	113,000
Tarakan, July to December (estimated)	15,000
Singapore, August to December (estimated)	15,000
Saghalin	5,000
Total	370,500

Fuel oil actually consumed by navy

Fiscal year 1924–25 (estimated)	235,000
Fiscal year 1925–26 estimated)	115,500

Fuel oil placed in reserve for navy

Fiscal year 1925–26 (estimated)	115,500

Storage capacity and fuel oil on hand May, 1925

	Tank capacity	Fuel oil in tanks
	Tons	*Tons*
Yokosuka Navy Yard	129,500	121,889
Kure Navy Yard	517,000	515,064
Tokuyama Fuel Depot	405,000	218,834
Sasebo Navy Yard	257,000	225,640
Maidzuru Navy Yard	145,000	118,173
Chinkai Navy Yard	9,000	8,158
Bako Navy Yard	27,000	22,600
Ominato Navy Yard	73,000	45,243
Ryojun Navy Yard	1,000	698
Total	1,563,500	1,276,299
Estimated increase during fiscal year 1925–26	62,400	115,500
Estimated totals, May, 1926	1,625,900	1,391,799

	Tons
Annual war consumption of fuel oil, Japanese Navy, as of Jan. 1, 1926 (estimated)	1,020,000
Oil tanks to be constructed so that by 1931 total tank capacity will be	3,000,000

Construction of floating docks for Japan and Italy

It is reported from German sources that a twin-screw, two-section floating dock for submarines is under construction in Japan for the Japanese Navy. The dock is to have a lifting power of 10,000 tons dead weight and 14 knots speed.

The plans are by a German and were sold to the Japanese Government. This dock is to be ready within two years and is to cost, complete, about $3,500,000.

A dock of lifting power of 35,000 tons dead weight is now being designed in Germany for the Italian Government.

JAPAN

AVIATION NOTES

[From the Japanese press]

Light cruisers to carry airplanes

The combined Japanese fleet, which has commenced the first-period training, is going to lay great stress on aviation. Airplanes will be assigned on board the cruisers *Jintsu*, *Naka*, *Kinu*, and *Abukuma*.

The 1924 type scout battle planes will be carried by these ships. Airplanes will take off from ships by means of catapult.

The Japanese Navy gradually intends to place airplanes on other ships than above mentioned.

New bombing plane

The Dornier bombing plane being built by the Kawasaki Dockyard Co., Kobe, under expert German employees' supervision has been completed, and that test flights will be made at the army air station at Kagamigahara.

Characteristics are also given as follows:

Length	feet	60
Span	do	90
Engines, 2 (arranged in tandem)	horsepower, B. M. W.	600
Speed	kilometers per hour	200
Radius	hours	11
Armament	machine guns	5
Useful load	tons	2½
Weight fully loaded	do	7½

Wind tunnel at Kasumigaura

A large wind tunnel under construction at Kasumigaura Naval Air Station is expected to be completed by the end of this fiscal year (March 31, 1926). This tunnel belongs to the aeronautical section of the naval technical research laboratory.

The diameter of the tunnel at the mouth measures 2½ meters, which is about double that of the present one. Four hundred horsepower motor power will be used for sending through air current.

New SS type dirigible for the Japanese Navy

An order was placed with the Fujikura Industrial Co. to supply the necessary parts for the construction of a remodeled SS type dirigible. These parts were delivered to the Kasumigaura Naval Air Station the latter part of 1925, and the work of assembling the dirigible has been going on since, and the first trial flight was scheduled to take place on January 18, 1926, but certain alterations have been found necessary, and it is probable that she may not be able to make a trial flight until the latter part of January.

This dirigible will be known as the "No. 1 type" dirigible. The dirigible is painted yellow, but no metallic paint has been used. Some of the characteristics are as follows: Gas capacity, 2,930 cubic meters; motors, two Benz, 130 horsepower each; armament, three Lewis type machine guns.

Some of the students taking the dirigible training course were scheduled to be graduated last November, but the school not having a dirigible, their graduation has been delayed.

Flight over Tokyo.

The Kasumigaura Naval Air Station is going to carry out a flight over Tokyo and Tokyo Bay for the purpose of taking photographs and otherwise obtaining data to be used in the study of how to properly defend Tokyo from aerial attacks. There will be 8 planes, made up in three groups, as follows:

First group.—Two of 1924 type attacking planes, Mitsubishi No. 4, Rear Admiral Ando, commander in chief of Kasumigaura, will be on board one of these planes.

Second group.—Three of 1920 scout deck planes, Mitsubishi No. 2.

Third group.—Three of Hansa scout seaplanes.

Naval aviator killed in attempting a landing on the "Hosho"

A Japanese naval flier was killed in Ariake Bay, Kyushu, on February 1, while attempting to land on the *Hosho* in an attacking plane. The machine overturned on the deck throwing the pilot into the sea.

NETHERLANDS

MISCELLANEOUS NOTES

Projected departure of new ships to the East Indies

The present plan is to have the submarine *K-XIII* sail for the East Indies about May 15, 1926, via the Panama Canal, San Francisco, Honolulu, Guam, and Manila, arriving in the East Indies about November, 1926.

The *K-XI*, which has experienced difficulties with its air compressors is being held in readiness to make the cruise planned for the *K-XIII* in case that vessel should develop any defects. Otherwise the *K-XI* will proceed to the East Indies via the Suez Canal.

The gunboat *Soemba*, when completed, about June, 1926, will proceed to the West Indies to remain three or four months and then to the East Indies via the Panama Canal, San Diego, Honolulu, and Samoa.

The itinerary of the cruise of the *Sumatra* to the East Indies has not been completed, but the first plan provides for a cruise to the West Indies, around South America to Valparaiso, and thence to the Dutch East Indies. A second plan is via the Panama Canal, west coast of the United States, Honolulu, Japan, and Manila. The third plan is via the Suez Canal. The cruise finally decided upon will depend upon the money available for fuel.

The shipbuilding plant Maatschappij voor Scheep- en Werktuigbouw "Fijenoord," Rotterdam

The shipbuilding plant of the Maatschappij voor Scheep- en Werktuigbouw "Fijenoord" at Rotterdam was recently visited. Inspection of the ships under construction for the Dutch Navy was not permitted, as these vessels are now in the hands of the Government.

The plant is 101 years old and many of the buildings and appliances are old and antiquated. However, the yard has a fine reputation and has turned out excellent work. At present the plant is being rebuilt and during the next two years the company hopes to erect new buildings and install modern appliances. It was stated that all these improvements were to be made out of reserve funds and that no new financing would be necessary. Up to the present they have not handled any repair work, but with the falling off of new ship construction they are considering taking on repair work. They also manufacture considerable sugar machinery. A new foundry of large capacity and modern appliances is to be placed in commission about February 1, 1926.

One thousand five hundred men are at present employed.

The new construction for the Dutch Navy, all of which will be completed by the spring, consists of: Submarines, *O11–, K–XIII;* gunboats, *Flores, Soemba.*

One oil tanker, 6,500 tons, has just been completed for Dutch account.

The keels of two 10,000-ton tankers have been laid for British account, one condition of the contract being that British steel is to be used. This will materially increase the cost, as steel from Germany could be obtained much cheaper.

The company has a contract for two submarines of about 650 tons for the Turkish Government. They are to be built from German plans. No work has been accomplished yet, no doubt due to the lack of money.

There is a completely inclosed building provided with two shipways for the construction of submarines.

Personnel of navy

The following is the personnel status of the Royal Dutch Navy as of October 1, 1925:

	Other than East Indies		East Indies		
				Men	
	Officers	Men	Officers	European	Native
Navy:					
Regulars	439	3,013	246	1,061	1,600
Reserves	105	164	7	99	0
Marines:					
Regulars	15	966	3	151	0
Reserves	0	0	0	0	0

NOTE.—Of this personnel, 51 officers and 520 men were assigned to aviation.

Organization of aviation branch of army

The air forces of the Royal Dutch Army consist of: Staff; flights and squadrons of (*a*) fighters, (*b*) scouts, (*c*) bombers; flying schools; and sections for repairs.

A flight of fighters consists of 10 planes (fighters); 1 officer flight commander; 1 flying officer; and 45 noncommissioned officers and privates, 8 of which are flying sergeants.

A scout flight consists of 8 planes (scouts): 8 flying officers: 8 observers (officers): 1 photo officer; and 52 noncommissioned officers and privates.

The composition of a flight of bombers has not yet been developed.

A squadron consists of 1 scouting flight (8 planes): 1 artillery flight (6 planes, 2 people); 1 protecting flight (6 planes, 2 people); 1 radio section; 1 photographic section; 1 technical section for repairs, antiaircraft. Total, 20 planes. Photo section and radio section each have one automobile.

The number of units to be formed is dependent upon the material and personnel as it becomes available by purchase and training.

The war department has stated that as an organization has not been completed, it is not possible to give the number of planes allocated to the various forces. However, it was stated that there were available at the present time about 250 planes.

The Dutch pilot is a good flier and enthusiastic, but military aviation development is slow.

RUSSIA

GENERAL CONDITIONS AND FOREIGN POLICY

[Source: O. N. I.]

There is probably no other country that holds the center of the world's stage as does Soviet Russia to-day.

Born of the revolution scarcely eight years ago, founded on principles at utter variance with those rules and regulations laid down by old and established nations for the guidance of their peoples; Russia, whose open boast is the overthrow of organized government and the rule of the proletariat, is crying for recognition from the United States, and asking us to help her in her economic development.

The overthrow of Nicholas II, the last of the Romanovs, the short provisional government under Kerensky, and the early days of Lenin and Bolshevik régime have passed into history.

Of what does Soviet Russia to-day consist?

Has Bolshevism succeeded?

What is the economic condition of the country, and what are those mutterings that the world has been hearing in the Far East for the past year?

These are some of the questions that we are asking ourselves, questions that notably concern us.

AS TO HER SIZE

The Union of Socialist Soviet Republics, the Russia of 1926, consisting of 11 autonomous Socialist Soviet Republics, 10 autonomous regions and 66 Provinces, embraces a territory of 7,041,120 square miles, and has a population of roughly 138,157,000 persons. Stretching from the White Sea in the north to the Black Sea in the south, and west from the Baltic to the peninsula of Kamchatka in the Far East, it comprises about one-seventh of the land surface of the globe.

THE POWER BEHIND THE THRONE

It is the most absolute form of government in the world, holding the people under a control far more rigid than they ever suffered under the Tzarist régime. Russia is ruled to-day by the political bureau of the Russian Communist Party, and the men who control her destiny are Stalin, Zinoviev, Rykov, Trotsky, Tukharin, Tomisky, Kalinin, Mololov, and Voroschilov.

This all powerful political bureau controls the Russian Communist Party, the Russian Soviet Republic, the Federation of Soviet Republics, the Communist International, the Russian Labor Union, and the Trade-Union International.

These gentlemen hold important offices in most of the parties mentioned, and when you consider the Communist International in its relation to the rest of the world they also have an unhealthy interest in our own affairs too.

Communism is doomed, at least so say Kerensky and Tolstoy. Only recently in the Saturday Evening Post, Isaac Marcosson appeared in a most interesting article entitled, "The Twilight of Bolshevism."

As we turn back the leaves and review Soviet Russia's economic history since November, 1917, it would look as though there were ample grounds for the opinions of these gentlemen. We find that the soviets have had to admit that communism and economic prosperity do not walk hand in hand. They have come to learn that man will not produce if he is unable to enjoy the fruits of his labor.

Experience has taught them that among the workers, some there are whose industry, superior intelligence, and natural thrift have placed them ahead of their less fortunate neighbors, that to deprive these men of their wealth, to put obstacles in their way, and to tax them all out of reason may be good communism but bad economics.

They are finding out that Russia, while enormously rich in natural resources, can not develop without the aid of the capitalistic nations of the world, and that conservative business is unwilling to invest unless it is satisfied in the stability of the debtor.

THE PEASANT QUESTION

Russia's treatment of the peasant question shows that her journey along the road of communism has been filled with concessions, concessions wrung from the Government, not willingly but because even they could see nothing but economic ruin in their destructive program.

From 1918 to 1920 were years of pure communism and Russia went from bad to worse.

In 1921, Lenin, realizing the necessity of a change, inaugurated in his "new economic policy," which legalized internal private trade. This was the water to the thirsty plant, things began to look up, and for three years Russian economic life showed certain signs of improvement.

This was strategic retreat No. 1.

In 1924 came a retrogression. The soviet leaders, fearful that the accumulation of private capital threatened their Government, turned back the hands of the clock, and put into operation the "new trade policy" whose aim was the elimination of the private trader, and the substitution therefor of cooperative organizations.

How well the plan succeeded is shown by the fact that this policy led to the liquidation of 250,000 private trade enterprises. Came retreat No. 2, for in March, 1925, the Neo Nep plan took its place, another change of heart characterized by the greatest liberality toward the peasant that the central government at Moscow has yet shown. Private trading is encouraged. Bills of private persons heretofore refused by soviet industrial organizations are now recognized. The sphere of the governmental aided cooperative has been lessened.

All of these reforms have led to the development of the Kulak or rich peasant, and there are indications at present that the Soviet Government is now considering how the activities of these capitalists can be curtailed, for the Kulak is now hindering the Government in its grain-export problem. In the palmy days the Government fixed the price which the peasant would receive for his grain, and in its own good time proceeded to export it when prices were favorable. Now it is the Kulak who has the corner on the grain market.

Will there be another retrogression? Judging from past history, there will.

HER ARMY

A survey of Soviet Russia's military and naval strength discloses the fact that her entire peace army numbers 1,035,700 men, and that she has 624,000 under arms at all times.

This army is well uniformed and as far as equipment goes is on a fair road to recovery from the disastrous effects of the revolution. New armament is constantly being manufactured. The morale varies, being high in some units and low in others.

On the part of the officers there is a lack of military knowledge, but steps are being taken to remedy this state of affairs, and there are now in existence 100 officers' schools. It will, however, be many years before the army will be well trained.

AVIATION

There are at present 762 planes in service in the Russian army. There are a total of 1,500 planes in Russia, and there are a total of 1,100 modern planes available for military use. The planes and motors are of all makes and designs. The knowledge of the number of aviators and their training is most limited. It is estimated that there are possibly 1,200 aviators in Russia. There are many schools in aviation but the soviets are most guarded in the release of any information on this subject.

ESTIMATE OF THE ARMY

In arriving at its estimate on the Red army, military intelligence has come to certain conclusions which are quoted in part as follows:

1. The Red army is at least as large as any army in Europe.
2. It is not as well trained as the army of any other great power.
3. On the defensive it is strong, on account of its great numbers, its large cavalry, and the great distances of Russia. A sustained offensive is impossible because the poor economic condition of Russia will not permit the manufacture or procurement of the necessary supplies.
4. Russia can win a war against any combination of border States which may form against her, if they are unaided by the great powers.
5. The red leaders will not risk their hold on the country by engaging in an aggressive war on any one.
6. A coup d'etat on the part of the old nobility is, at present, completely out of the question.
7. As a final estimate, it may be stated that it will take a major effort on the part of any one great power to defeat Red Russia now.

THE NAVY

The Russian Navy has a personnel of about 30,000 officers and men.

Strength

3 battleships.
7 cruisers.
1 aircraft carrier.
80 destroyers.
4 sloops.
26 coastal motor boats.

2 gunboats.
4 river gunboats.
6 torpedo boats.

28 submarines.
9 mine sweepers.

UNDER CONSTRUCTION

1 battleship (building stopped—probably will not be completed).
3 submarines.

4 cruisers (of these one should be ready now—doubtful if others will be completed; may be converted to oil tankers).

CONSTRUCTION PROGRAM

Baltic fleet

2 light cruisers.
4 destroyers.

7 submarines.

Black Sea fleet

1 light cruiser.
8 torpedo boats.

12 M. A. S. Vedettes—torpelleurs of 14 tons displacement.

Extreme Orient

6 gunboats.

Efficiency and Morale

The Russian Navy is in very poor condition. Many of the ships listed are badly in need of repair, some damaged beyond repair, and many others so old that they are classed as obsolete.

This list includes the Bizerta fleet (the so-called Wrangel fleet turned over to France for safe-keeping), which has been neglected to the extent that it has largely lost its value except for being broken up and sold as old metal.

There are in addition some ships which are but hulks and are not considered worthy of mention.

In short, Russia's navy is very much run down. Efforts are being made to place the navy in as good a state of repair as possible, but it has been neglected for so long and conditions in Russia have been so chaotic that this is a Herculean task.

Owing to the state of repair, the age of the ships, the lack of training of the officers, and the discipline of the crews, Soviet Russia is not a factor which need give first-class sea powers cause for much apprehension.

AS TO PROPAGANDA

Russia is a menace to the rest of civilization.

In her intent to establish world communism she seeks the overthrow of all capitalistic nations.

The Communist International in its attempt to plant its cells of propaganda in every vital industrial organization aims to paralyze industry and from the attendant chaos to evolve a communistic form of government.

Few are the countries which have not and are not to-day feeling the result of this sinister influence. The discontented worker, the man with a grievance, and the unemployed, these are all grist for the mill.

In the land of ample wages, prosperous industrial conditions, and contented labor Moscow finds her path beset with difficulties. As a healthy man naturally throws from his system the germs of a malignant disease, so a strong, healthy nation, enjoying peace and prosperity, is its own best remedy.

Propaganda has estranged Russia from the rest of the world, and her embassies, with their enormous staffs, which have been used for this purpose, are becoming more and more unpopular.

Along these lines Moscow has executed another retreat.

Orders have gone forth that henceforth embassies and propaganda are to be as strangers. Cordial invitations are now being sent for delegations to visit Russia. Once there, intensive instruction is the order of the day, with the hope that converted red nationals will on their return carry on in their own country the destructive program. Europe, war worn and industrially a sick man, is convalescing. Under the healing influence of Locarno the invalid promises to recover e'er long, and so the soviets, true to form, are now turning their eyes to the Orient, hoping to find in China the path to their goal.

CHINA NOW AN OBJECT OF HER ATTENTION

The shuttle of the Far East is to-day rapidly weaving a new fabric, and the threads of the warp and woof are making a colorful pattern of orange and red.

The leading figures of the Chinese drama are Feng Yu-hsiang and Chang Tso-lin. The former backed by Russia; the latter aided by Japan.

The history of Chinese revolution is a tangled maze of plot and counterplot against the weak central government, but of far more absorbing interest to the world at large are the motives underlying the stand taken by the two great powers behind the scenes.

Soviet Russia by aiding the Chinese national movement is deliberately attempting to cause a revolution in China. Stalin expressed one of the phases of its policy when he stated that the combining of the national emancipation movement of the peoples in the east with the proletarian movement of the foremost countries of the west would insure the victory of the world revolution.

This view was held by Lenin, the father of Bolshevism, and the same sentiments have recently been expressed by Rykov and Chicherin.

Europe has become stabilized and Russia, thanks to her destructive program and mischievous propaganda, is becoming more and more isolated.

Taking the above into consideration and at the risk of repetition, let us review the present state of Soviet Russia in order to show how she is being influenced toward her present course.

It is reported that the Russian Communist Party is now in an extremely difficult situation, and hope for social revolution in Europe is gone.

The price of industrial commodities in Russia is prohibitive.

The Soviet Government is unable to obtain grain from the peasants except at prices that forbid its export.

The railroads are in a very poor condition and badly need attention.

Communist propaganda has largely failed except in oriental countries, and the capital that Russia so needs for the rejuvenation of her industries is not forthcoming in any appreciable amounts. Added to this we learn that all is not well within the Communist Party itself, and that there is serious internal dissension.

These are the vital considerations that are now causing Russia to turn her eyes to the east. Looking at it from another angle it would appear that the old Tzarist policy of aggression in China is not dead.

There still remains the desire for a warm salt water port, and there is still her interest in Manchuria through which runs the Chinese Eastern Railway which she controls. In furtherance of her ambitions, she is behind the Chinese national movement. Between the Kuomingtang Government at Canton and the soviets the most intimate relationship exists. Her influence in Mongolia is well known, and she is establishing a network of consulates in western China. Feng Yu-hsiang with his army, dependent to a certain extent on Russia for money and the sinews of war furnishes a background which she can not afford to neglect.

Should he win out over his rival Chang Tso-lin, and gain control over Manchuria, valuable concessions might follow. Through him in Shantung might lie the hope of a warm salt water port, Tsing-tao.

Economically Japan and Russia divide Manchuria by their two railway systems. The Chinese Eastern Railway in the north, normally under the joint management of China and Russia, is actually controlled by Russia. South from this extends the South Manchuria Railway, Japanese owned.

Japan has vast interests in Manchuria and has invested millions of yen for the development of those industries, which the limited extent of their small island Empire prevents. The Chinese Eastern Railway and the South Manchuria Railway are in keen competition. Awhile back when the finances of the former were in a bad way the South Manchuria Railway loaned the Chinese Eastern a large sum of money and in return obtained preferential rates for freight shipped out of central Manchuria, via the South Manchuria line.

Manchuria raises soy beans, which the Japanese use in great quantities.

A little while ago Russia cancelled these preferential rates, establishing an opposite preference via Vladivostok, causing great loss to the South Manchuria Railroad Co.

Feng Yu-hsiang and a Sovietized Manchuria would not it is believed be at all in accord with Japanese policy in China. Rather Chang Tso-lin and a government entirely subservient to Japanese interests.

So the shuttle weaves its varying strands of orange and red, only the loom is in the Orient and Europe rests a pace.

It is impossible to conceive that Russia with her vast national resources, and her strong virile peoples will not some day take her place among the foremost of the nations of the world. It is also as repugnant to believe that the present Government of Russia, standing for what it does, defying those principles for which our forefathers fought, can long endure.

Clouds seem gathering in the east. It may be that in the Orient communism is making its last stand.

"The twilight of Bolshevism." Who knows!

RUSSIA

THE SOVIET BALTIC FLEET

[Source fairly reliable]

Herewith follows the name, type, speed, armament, and general remarks concerning ships of the Soviet Baltic fleet as of February, 1926:

(a). Battleships

Marat (formerly the *Petropavlovsk*). Launched 1911:

Displacement: 26,000 tons.

Speed: 23 knots.

Armament: Twelve 30.5-centimeter, sixteen 12-centimeter, two 63-millimeter, one antiaircraft gun, four 45-centimeter torpedo tubes.

Remarks: This vessel is in good order and took part in an extended cruise in the Baltic. Has been observed at exercises with a speed of 18 knots during 1925.

Parizkaja (formerly the *Sevastopol*). Launched 1911:

Displacement: 26,000 tons.

Speed: 23 knots.

Armament: Twelve 30.5-centimeter, sixteen 12-centimeter, two 63-millimeter, one antiaircraft gun, four 45-centimeter torpedo tubes.

Remarks: This vessel is in good order and took part in an extended cruise in the Baltic in 1925.

Gangut. Launched 1911:

Displacement: 26,000 tons.

Speed: 23 knots.

Armament: Twelve 30.5-centimeter, sixteen 12-centimeter, two 63-millimeter, one antiaircraft gun, four 45-centimeter torpedo tubes.

Remarks: This vessel is at present undergoing extensive repairs. Will be ready in 1926.

Poltawa. Launched 1911:

Displacement: 26,000 tons.

Speed: No information.

Armament: Twelve 30.5-centimeter, sixteen 12-centimeter, two 63-millimeter, one antiaircraft gun, four 45-centimeter torpedo tubes.

Remarks: Owing to the impossibility of building battleships in Russia at the present time it is proposed to try and repair this vessel. The repairs, however, will be extensive, as both double bottoms, boilers, and electrical installation must be renewed.

(*b*) *Armored cruisers*

Rurik. Launched 1906:

Displacement: 16,900 tons.

Speed: 21.5 knots.

Armament: Four 25.4-centimeter, eight 20.3-centimeter, twenty 12-centimeter, four 47-millimeter, 2 machine guns, 2.45-centimeter torpedo tubes.

Remarks: This vessel is probably in very good condition. Took part in extended cruise in Baltic during 1925.

(*c*) *Cruisers*

S. S. S. R. Sojus Sotsialistitscheski Respublik (formerly the *Aurora*). Launched 1900:

Displacement: 6,800 tons.

Speed: 18 knots.

Armament: Ten 15-centimeter, five 57-millimeter, one antiaircraft gun.

Remarks: This vessel is in good order. Is now used as a training ship for cadets. Visited Gotenburg in 1925.

Profintern (formerly *Klara Zetkim* or *Swjetlana*). Launched 1915:

Displacement: 6,800 tons.

Speed: 30 knots.

Armament: Fifteen 13-centimeter, four 10-centimeter, one antiaircraft gun, two 53-centimeter torpedo tubes. Can take 100 mines.

Remarks: This ship has been undergoing repairs. Repairs are probably finished now.

(*d*) *Armored gunboats*

Krassnoje Znamya (formerly the *Chraby*). Launched 1895:

Displacement: 1,740 tons.

Speed: 14 knots.

Armament: Two 12-centimeter, two machine guns.
Remarks: Repaired in 1923. Not in good order, but can be used. Now used as a training ship for the gunnery school.

(e) Gunboats

Krassnoje Zviezda (formerly the *Chibinetz*). Launched in 1905:
Displacement: 1,340 tons.
Speed: 13 knots.
Armament: Four 12-centimeter, one 37-millimeter, one antiaircraft gun.
Remarks: Can be used in the service, although not believed to be in good condition. Now used as a training ship for the younger cadets.

Bednota. No information.

Nadjeschny. No information.

(f) Destroyers

Uritzki (formerly the *Sabijaka*). Launched 1914 or 1916.
Displacement: 1,600 tons.
Speed: 30 knots.
Armament: Four 10-centimeter, one 40-millimeter, 1 anticraft gun, 2 machine guns, nine 45-centimeter triple torpedo tubes. Can take 80 mines.
Remarks: In service order. Most probably took part in the Baltic cruise of 1925.

Wolodarski (formerly the *Popjedite*). In all respects similar to the *Uritzki* given above.

Karl Marx (formerly the *Isjaslaw*). Launched 1914.
Displacement: 1,350 tons.
Speed: 32 knots.
Armament: Four 10-centimeter, one 63-millimeter, 1 antiaircraft gun, nine 45-centimeter triple torpedo tubes. Can take 80 mines.
Remarks: In service order. Most probably took part in Baltic cruise of 1925.

Pamiat Troe Osminsev (formerly the *Brjatschisloff*). In all respects similar to the *Karl Marx* given above. Same general remarks apply.

Fjodor Stratilaff. Launched 1914-1917:
Displacement: 1,350 tons.
Speed: 32 knots.
Armament: Five 10-centimeter, two 63-millimeter, 1 antiaircraft gun, nine 45-centimeter triple torpedo tubes.
Remarks: Now undergoing extensive repairs.

Kalenin (formerly the *Prjamislaff*). In all respects similar to the *Fjodor Stratilaff* described above. Also now undergoing repairs.

Trotzki (formerly the *Leitnant Iljin*). One of five launched during the period 1914–18.
Displacement: 1,260 tons.
Speed: 28–30 knots.
Armament: Four 10-centimeter, one 40-millimeter, 1 antiaircraft gun. Can take 45 mines.
Remarks: Most probably in good order.

Stalin (formerly the *Samsson*). In all respects similar to the *Trotzki.*
Remarks: Reported to be in excellent order.

Engels (formerly the *Desna*). In all respects similar to the *Trotzki*, and remarks apply as well.

Sinovjeff (formerly the *Azard*). In all respects similar to the *Trotzki*, and remarks apply as well.

Lenin (formerly the *Kapt. Izymletjeff*). In all respects similar to the *Trotzki*.

Remarks: Reported to be now undergoing repairs.

NOTE.—It is probable that the five last-named destroyers took part in the Baltic cruise of 1925.

Gen. Kondratenko. Launched in 1905:

Displacement: 750 tons.

Speed: 26 knots.

Armament: Two 10-centimeter, two 47-millimeter, two machine guns, three 45-centimeter torpedo tubes.

Remarks: Can be used, but not in very good order. Now reported undergoing repairs.

Mjatki. Launched in 1905:

Displacement: 410 tons.

Speed: 26 knots.

Armament: Two 75-millimeter, two machine guns, two 45-centimeter torpedo tubes.

Remarks: Can be used but not in very good order. Now reported to be undergoing repairs.

Kapt. Belli, Kapt. Kern, Kapt. Kroun, and *Kapt. Ssotoff.* These four destroyers were launched during the period 1914–1916.

Displacement: 1,260 tons.

Speed: 31 knots.

Armament: Four 10-centimeter, two 63-millimeter, 1 antiaircraft gun, two machine guns, nine 45-centimeter triple torpedo tubes. Can take 45 mines.

Remarks: No information available as to condition. All in reserve.

Orphe. Launched 1915:

Displacement: 1,610 tons.

Speed: 30 knots.

Armament: Four 10-centimeter, one 40-millimeter, 1 antiaircraft gun, nine 45-centimeter triple torpedo tubes.

Remarks: From reports not believed to be in seaworthy condition.

Letun (formerly the *Leitn. Dubassoff*). Launched 1916:

Displacement: 1,260 tons.

Speed: 30 knots.

Armament: Four 10-centimeter, one 63-millimeter, one antiaircraft gun, two machine guns, nine 45-centimeter triple torpedo tubes.

Remarks: No information available as to condition.

(*g*) *Submarines*

Batrak (formerly the *Kaguar*). Launched 1916.

Displacement: 790 tons.

Speed—

Surface: 16 knots.

Immersed: 9 knots.

Armament: Two 75-millimeter, 1 antiaircraft gun, one 37-millimeter, 4 torpedo tubes, 8 outside the hull torpedo tubes.

Remarks: In good order.

Yas. Launched 1917.
Displacement: 790 tons.
Speed: Unknown.
Armament: One 75-millimeter, 4 torpedo tubes.
Remarks: In bad condition, but very meager information available.

Wjopr. Launched 1915.
Displacement: 790 tons.
Speed: Unknown.
Armament: One 75-millimeter, one 37-millimeter, 4 torpedo tubes.
Remarks: In bad condition.

Balzak (formerly the *Wolk*). Launched 1915.
Displacement: 790 tons.
Speed: Unknown.
Armament: One 75-millimeter, one 37-millimeter, 4 torpedo tubes.
Remarks: In bad condition.

NOTE.—It is reported that four submarines are being built at the Baltic yard. Leningrad. According to information at hand these submarines will have a tonnage of 850, and a speed of 15 knots on the surface, 10 knots immersed, and as armament be equipped with one 10-centimeter gun, 1 antiaircraft gun, and 10 torpedo tubes.

(*h*) *Minelayers*

Rabotschy (formerly the *Yorsch*). Launched 1917.
Displacement: 790 tons.
Speed—
Surface: 12 knots.
Immersed: 9 knots.
Armament: One 76-millimeter, 1 antiaircraft gun, 1 machine gun, 4 torpedo tubes. Can take 42 mines.
Remarks: Reported undergoing repairs for purpose of installing new torpedo tubes. Repairs probably now finished.

Forelj. Sister ship to *Rabotschy.* Description as above.
Remarks: In reserve. No information as to condition available.

Krassnoarmeyetz (formerly the *Leopard*), *Komissar* (formerly the *Pantera*), *Bolsherik* (formerly the *Ryss*), *Krasnoflotetz* (formerly the *Jaguar*), *Kommunar* (formerly the *Tigr*), and *Tovaristch* (formerly the *Tur*).
The above six named minelayers are believed to have been launched in 1916.
Displacement: 790 tons.
Speed: 16 knots surface, 9 knots immersed.
Armament: One 76-millimeter, 1 antiaircraft gun, 1 machine gun, 4 torpedo tubes, 8 outside the hull torpedo tubes.
Remarks: *Krassnoarmeyetz* is in fairly good condition. The *Kommunar* is in very bad condition and it is believed will be scrapped. The *Tovaritsch* went aground this summer. Uncertain if repairs can be made.

Proletari (formerly the *Znoya*). Launched in 1917. No information available.
Remarks: It is believed that this vessel will be scrapped.

Kommunist (formerly the *Sviatio Georg*). Launched 1916.
Displacement: 400 tons.
Armament: 2 small guns, two 45-centimeter torpedo tubes.
Remarks: No further information available. Very uncertain if this ship has any service value.

(*i*) *Special service ships*

Informant states that ships of this class named hereafter are not in use or commission or are undergoing repairs at various places. Reports received are conflicting and information is not to be considered reliable.

(*a*) Training ships

Komsomoletz (formerly the *Okean*). Launched 1902:
Displacement: 11,700 tons.
Speed: 18 knots.
Armament: Six 47-millimeters.
Remarks: This ship is in service and visited Gotenburg in 1925.

(*b*) Mine layers

9 Januarja (formerly *Swaniwarja*). Launched 1905:
Displacement: 1,700 tons.
Speed: 10 knots.
Armament: Four 47-millimeters. Can take 200 mines.
Remarks: No further information.

Lakta and *Lokta*. *Lokta* launched 1889:
Displacement: 4,800 tons.
Speed: 10 knots.
Armament: No information.
Remarks: No further information available.

Narowa (formerly the *General Admiral*). Launched 1872:
Displacement: 5,000 tons.
Speed: 10 knots.
Remarks: Nofurther information.

(*c*) Mine sweepers (ex-destroyers)

Michail, *Mjetschislaff*, and *Ssokol*. All launched 1914–1916:
Displacement: 1,260 tons.
Speed: 30 knots.
Armament: Four 10-centimeter, 2 machine guns, two 63-millimeters, 1 antiaircraft gun.
Remarks: Reported to be in fairly good condition.

Zemschushuyi (formerly the *Ins. Swerjeff*), *Rosalj* (formerly the *Ins. Dimitrijeff*), *Artemjeff* (formerly the *Wynoslic*), and *Wnimateinu*. All launched about 1905:
Displacement: 350 tons.
Speed: 22 knots.
Armament: Two 75-millimeters, 4 machine guns.
Remarks: All probably in good order.

Lichoi. Launched 1905:
Displacement: 410 tons.
Speed: 26 knots.
Armament: Two 75-millimeters, 2 machine guns.

(*d*) Mine trawlers

Kljus, Newod, Schstchit, Strjela, Udarnik, and *Nr. 213.* All launched 1913:
Displacement: 500 tons.
Speed: 11 knots.
Armament: Two 75-millimeters.
Remarks: No further information available.

Fugas, Sapal, Prowodnik, and *Minrep.* All launched 1910:
Displacement: 150 tons.
Speed: 10 knots.
Armament: Two 40-millimeters.
Remarks: No information as to condition available.

(*e*) Depot ships for submarines

Smolny (formerly the *Evropa*). Launched 1878:
Displacement: 3,200 tons.
Speed: 10 knots.
Armament: Four 47-millimeters.
Remarks: No further information given.

Chabarowsk. Launched 1895:
Displacement: 2,800 tons.
Speed: 10.5 knots.
Armament: Two 75-millimeters, two 47-millimeters, two machine guns.
Remarks: Reported to be undergoing repairs.

Kommuna (formerly the *Volkov*). Launched 1913:
Displacement: 2,400 tons.
Speed: 10 knots.
Armament: Two machine guns.
Remarks: Most probably undergoing repairs.

(*f*) Oilers

Ad. Spiridow, Ad. Grieg (or *Greig*), and *Ad. Bukatow:*
Displacement: 6,800 tons.
Remarks: No information available as to condition of these ships. Planned, built, and launched as cruisers but not converted to oilers or oil tankers.

(*g*) Yachts (similar to admiralty yachts)

Kretschnet. Launched 1890:
Displacement: 3,600 tons.
Speed: 18 knots.
Armament: Six 75-millimeters.
Remarks: No further information available.

(*h*) Patrol ships

Pioner (formerly the *Korshun*):
Displacement: 500 tons.
Speed: 12 knots.
Armament: Two 10-centimeters.
Remarks: Further information not obtainable.

Kopchik. No information as to description of this vessel available.

(*i*) Torpedo repair ships

Borgo. Launched 1882:

Displacement: 5,200 tons.

Speed and armament: No information.

Remarks: This vessel is reported to be in good condition. Has been in use during winter of 1925 26 in the Finnish Bay.

(*j*) Ice breakers

Yermak, Lenin, and *Trotzki:*

Remarks: These vessels are all in good order and have been observed at work during the winter.

The new naval program includes an expenditure of £4,000,000 sterling. It is intended to build 6 light cruisers, 12 destroyers, 6 gunboats, and 6 mine layers. These ships will be designed by German naval constructors. The following gentlemen, Mr. Frounze and Mr. Zoff, are very enthusiastic in regard to the future of the Soviet Navy, and were on board the *Marat* during the cruise of approximately 2,000 miles in the Baltic. Upon their return to Kroninstadt they visited the Putiloff works. Soviet naval estimates for the current year are 1,999,000,000 rubles for ordinary expenditures and 279,000,000 rubles for extraordinary expenses of the navy.

Informant stated that most of the ships of the Soviet Baltic fleet have lost considerably in speed, evidently on account of lack of care and maintenance. This situation is no doubt brought about by lack of skill, lack of means, and lack of suitable personnel for crews. The Commander in Chief Zoff works untiringly to get the soviet fleet in good operating condition. The Russian squadron, which this summer was on an extensive cruise of the Baltic, amongst other places, visited the Great Belt. This squadron probably consisted of 2 battleships, the cruiser *Rurik*, about 10 destroyers, and a small number of submarines. The crews of the various ships were reported to be very inefficient, which is confirmed by the great number of accidents which took place during the exercises.

Informant stated that in addition to the submarines reported under construction at the Baltic yard, it is planned to build in the Putiloff works two cruisers of 3,000 tons and four destroyers of 1,400 tons, all of which to be ready in 1931.

Informant stated that the speeds indicated herein were not believed to be the actual service speeds of the various vessels, particularly destroyers. The actual service speed of the destroyers which have undergone extensive repairs and overhauls he estimated at 28 to 30 knots. He also stated that the *Marat*, *Pariskkaja Commuua*,

and those destroyers reported to be in good order were fitted with smoke-screen apparatus and gas shells.

Informant also stated that he believed the reports relative to designing of submarines by German engineers for the soviets, also their contemplated building or partial building in German yards, to be untrue.

A new title has been instituted for ships which distinguish themselves, namely, mother ships. Vessels having this title will have the right of making cruises abroad. They will have a red star on the first funnel and a red ribbon around the flag, with the inscription, "mother ship."

Method of Recruiting and Forming the Staff of the Fleet

(*a*) NAVAL SCHOOLS

The existing rules have been recently modified by the introduction of an examination for admission to the navy school. By this means it is hoped to obtain a better element for the school. For admission the candidate must have accomplished some studies beforehand and the examiners must be satisfied of the candidate's belief in the Communist idea. The naval school is attended by the pupils for three years. Boys can be admitted from 17 to 24 years of age. The examination is held in Leningrad, and successful candidates can be admitted to the following schools:

(1) *Military maritime school*

Candidates must attend three years, on shore during the winter, on board during the summer. Candidates promoted from this school are officers of the general staff without specialization. The title given to these candidates is commander and corresponds to inferior officers in other navies.

(2) *Hydrographic school*

Three years' course, which is followed partly on shore and partly on board ships of the hydrographic department. The candidate when promoted is called a maritime hydrographer and sent to the service for navigational duty. This school is very similar to the Italian Hydrographic Institute. Officers have the same rank as line officers but the stripes are of silver instead of gold. Eventually they can be appointed navigating officers of the largest ships.

(3) *School of engineering*

Has a five-year course of three sections as follows: Naval constructor; engineers; and electrotechnicians. These courses are also followed on shore and on board ship. The candidates after promotion are called, respectively, naval constructor, officer for the direction of the engines, and el ctrotechnical constructor. The last two named are employed on board ship for the direction of the engine service and electrical plant.

The above schools are located in Leningrad, and a new one is being built at Sebastopol.

(*b*) ADVANCED COURSES

After two years' experience on board ship th naval officer can make application for one of the advanced courses on the following special subjects: Artillery, torpedoes, navigation, submarine navigation, technical service, intelligence service, and aviation. With the exception of the last two named thes courses are conducted at the naval school in Leningrad. The officers promoted from the aviation school are called specialists. These courses are not compulsory.

Another advanced institute of instruction called the military naval academy is situated in Leningrad. Superior officers may be appointed to this course, which comprises the following items: (1) Strategy and tactics; (2) weapons; (3) hydrographic; (4) engineering, hulls, and motor construction; (5) electrotechnics. The course lasts two years. It has the main characteristics of a war course and is a school for the preparation of officers for appointment to the high commands.

(*c*) COMPULSORY MILITARY SERVICE

Officers must remain in the navy compulsory 18 months for every year which has been spent in the school. Those sent to the military naval academy are requested to pledge themselves for a further service of 24 months for each year spent in the academy.

(*d*) CLASSIFICATION OF OFFICERS

The command is divided into 4 groups and 14 categories.

The first group comprises the first and second categories and corresponds to the Italian petty officers. The second group comprises the personnel who exercise medium command and corresponds to the inferior officer of other navies. The fourth class has no corresponding rank in the Italian Navy. The fifth category are

officers called subordinate to the watch commander and corresponds to sublieutenant. The sixth category comprises the commander of the watch and corresponds to lieutenant.

The third group comprises personnel of the second command and comprises the seventh, eighth, and ninth categories and corresponds to the superior officers of other navies. Titles given are as follows:

Seventh category——— Commander of a ship, third class.
Eighth category——— Assistant commander of a ship, first class.
Ninth category——— Captain of a ship of second class and corresponds to the Italian postcaptain.

The fourth group comprises the personnel of the superior commands and comprises the tenth, eleventh, twelfth, thirteenth, and fourteenth categories and corresponds to the Italian flag officers. The titles given are as follows:

Tenth category——— Captain of a ship of the first class equal to a commodore.
Eleventh category——— Commanding officer of a brigade of ships corresponding to rear admiral.
Twelfth category——— Commanding officer of a flotilla corresponding to a vice admiral.
Thirteenth category——— Commanding officer of the naval forces in one sea corresponding to an admiral.
Fourteenth category——— Commanding officer of the whole of the naval forces of the Soviet Union and corresponds to admiral commander in chief.

The commodore who commands one ship is often found among these appointments, and often the very highest ranking officers are given command of a unit of small importance. For instance, one section of three destroyers constitutes a brigade of ships and is commanded by a rear admiral; a fleet of destroyers is considered as a ship of the second class and is commanded by a postcaptain. There is, therefore, on these types of ships no unity of command as yet. There is present on board the commissaire, who holds rank equal to the commanding officer, and in one section of three destroyers will be found the following officers in command: 2 rear admirals (1 is the commanding officer and the other the commissaire), 7 postcaptains (3 commanding officers and 3 commissaires of equal rank), and 1 navigating officer of the squadron.

The same things are noted on shore. All of the officers commanding the naval schools are admirals or vice admirals. The officers of the general staff are directed by a postcaptain or a rear admiral who is also working with a political commissaire of the same rank. The result of this system is a very poor accomplishment of the job; and due to the different authorities, many employees are seen doing services which an able seaman could be trusted to do.

The political commissaire has rank only in the second and fourth groups; therefore political commissaires of the rank of petty officers do not exist. The political commissaire acts on board ship and in the bureaus and departments on shore according to instructions of a secret nature. Officers of the general staff are very seldom used as political commissaires. Paymasters and acting paymasters belong to the political personnel. The political personnel are divided into three groups: (1) Principal command, (2) political command, and (3) law. Political commissaires and their assistants sent on board belong to the first class. To the second class belong the personnel who distribute political propaganda and to the third class belong the lawyers, solicitors, and personnel of the military courts, etc.

The medical service is divided into four groups.

(c) LIMIT OF AGE AND PERIOD OF SERVICE

The limit of age, and a minimum and maximum age for every service function were introduced into the soviet navy during the military reformation of 1924 and 1925. The age limit is fixed low in order to have young men in the superior ranks and also to obtain a good reserve of young men physically efficient and capable of finding civil occupation when they are released from the navy. The period of time considered for certain ranks is also directly influenced by the question of age, as it is compulsory for every man to obtain promotion after he has spent a certain time in the same rank. If he is not promoted he is released from the navy, and if he has not the required age he is discharged from the service.

The limit of age and the maximum and minimum periods above mentioned are indicated in the following table:

Function	Maximum period	Limit of age
Group I:	*Years*	*Years*
Category 3, 5, and 6	8	32
Category 7	5	37
Category 8	4	41
Category 9	4	45
Category 10 and superior officers		50
Group II		40
Group III		45
Group IV		50
Category 3 and 4		26
Category 5 and 6		28
Category 7 and 8		30
Category 9		33

Medical personnel limited to 36 years.

Appointments of all related to the tenth category and superior officer class in an administrative and political capacity are fixed in Group II, III, and IV given above.

RUSSIA

MISCELLANEOUS NOTES

Torpedoes, mines, and mine-laying submarines

[Source: M. I. D.]

The torpedo practices held this year showed both torpedoes and floating mines to be in very poor condition.

The mines used in practice were obtained from the Kronstadt Mine Depot. Their condition as to assembly and functioning of mechanical parts was not tested on the ships before using, but in view of the fact that 25 per cent of the mines and torpedoes failed to function and sank, urgent orders were given that all mines and torpedoes, both on board and in the depots should be immediately inspected.

This inspection proved that the conditions of storage were bad and that 50 per cent of all the mines in depot were unfit for use. Of the torpedoes 30 per cent were discarded as unfit. Mine-laying practice with mines that had been retained as suitable for service resulted in a further 10 per cent of sinkages.

Mine-laying practice was carried out by the destroyers in frontal formation at a speed of 10 knots, mines being released at 30 seconds per mine. Present Russian crews are incapable of faster laying. The chief defect in laying proved to be the badly depreciated state of the anchors, which completely failed to cast off hawsers or else dropped them to the wrong level; and also the hydraulic depth gauges worked poorly.

The mines used in practice were the only ones now in depot, i. e., types L, NL, and KR. The remaining types have all been used up and are not replaced.

Tests of mechanical antitrawling equipment were also carried out, the results of which are not available.

Practice in mine laying by submarines was carried out with new types of mines. A number of innovations have been introduced in this respect during the autumn of this year. First, the mines are placed on submarines of the usual type (not mine layers) by a new equipment, the Ashurov apparatus, in such a way that 16 mines are mounted on rails placed on the deck cistern. In addition, bands are mounted around the conning tower to hold 8 mines. Thus every submarine carries 24 mines when cruising.

It is planned to carry out mine laying by submarines only in "bunches" in channels, or in fields by detachments of submarines.

There is only a very small reserve of special mines for the conning towers of submarines. The total number of these mines fit

for service left over from the old régime is 140, and energetic pressure measures have been adopted for the production of new types suited to modern submarines. They have been ordered from the Metallitcheski Works, Leningrad.

The submarine mine layer *Rabotchi* (at present the only submarine of its type in the Baltic fleet) carries 12 mines. According to the estimates of the Baltic fleet staff, a detachment of 4 submarines, of which 1 is a mine layer, can effect the mining of a zone. To date this method had not been adopted by the Russian fleet, and the Bolsheviks count strongly for the future on this innovation in procedure.

It is intended to adapt two more submarines as mine layers, using part of the present torpedo space for mines, but which two they are to be is not yet quite certain.

All submarines to be built in the future will be mounted with equipment enabling them to carry mines on their cruises and lay them in channels and along courses.

Work has already been commenced on the submarines for these alterations. The Dzhevestki torpedo tubes have been removed and replaced by tubular apparatus known as "B.50" (? or "V–50"). The Dzevestki tubes have been discarded as unsatisfactory owing to inaccurate distribution of internal pressure. Fore and aft tubes of the old types have been left. All the beam tubes have been taken down and will not be remounted, "nests" being mounted instead to hold mines. Along the whole length of the deck cistern rails are being fixed for mine laying, and also side "droppers" for laying mines in "bunches." In the fore section of the submarine the rails end at the sides of the conning tower, from which place the actual laying of the mines is effected.

Reserves of mines at the present time (after inspection) is as follows (description of these types of mines is not given as they are all old and well-known types): Type L, 520; type NL, 600; and type KR, 600. These figures cover the entire reserve of loaded and mounted mines.

Of the types of antisubmarine mines only one has survived—the old river mine "Ribka" (types R and FR), both loaded with one and a half poods of explosive. They consist of a thin iron envelope loaded with explosives (T. N. T. and pyroxiline, and recently also with siorite) with a mechanical-chemical fuse. Mechanical contact with a submarine, or even oscillation of the mine due to the passing of a submarine in the vicinity causes chemical action of the picric fuse (the fuse used in a 1923 type). Until 1923 old type fuses were employed, purely mechanical in action. Reserve of mines: Type R, about 400; and type FR, about 700.

No new supplies of mines are intended this year, but it is planned that next year's program include 2,000 mines.

Improvements have been introduced into the protective equipment of mines in connection with the constant difficulties in laying them: that is, instead of the former 15-minute sugar protection, a new method has been introduced, slower in action, whereby the sugar does not melt until 25 minutes after the mine has been placed.

Whitehead torpedoes, types 1908 and 1912, are only used from stock. At the present time Whitehead torpedoes, type 1914, have been improved to give an extended range of action. The supply of Whiteheads is dwindling, and all that remain are being converted to the improved 1924 type as below.

The 1924 improvement consists of a simple arrangement under the air tube, passing from the main reservoir to the pneumatic mechanism. The tubing is surrounded by a second tube forming a reservoir, under which is mounted an ordinary oil burner, automatically lighted when the torpendo is fired. Ignition is effected by compressed benzine vapor, still further compressed, at the moment when the torpedo is released, up to ordinary ingnition pressure. An electric spark is then passed through the mixture and the benzine explosion lights the wicks of the oil burner. The air passing through the mechanism compartment is thereby heated and gives increased activity to the mechanism, so that the speed of the torpedo is increased, and its range lengthened to 20 cable lengths. This, however, has been provided by trials to be the limit of the range; firing under combat conditions is effective only to 18 cable lengths. Air in the reservoir remains as heretofore, 150 atmospheres pressure. In summer the pressure has to be decreased owing to the heat of the sun, in order that pressure at an average temperature of 15 degrees should not exceed 120 atmospheres.

[From the German press.]

Cruise of fleets

The Grecian Government received information from Moscow some time ago that the soviet Baltic fleet was to make an extensive cruise, visiting Riga, Stettin, Portsmouth, Toulon, Genoa, Piraeus, and Constantinople. The Grecian Navy Department also received information that the Red fleet would make a protracted stay in Constantinople until the conclusion of the negotiations between Moscow and Angora regarding the reinforcement of the Russian Black Sea fleet. The Soviet Government insists in its demands to maintain a Black Sea fleet as large as that existing in 1918. Since

France has not yet returned the Wrangel fleet to Russia. Moscow began overtures with the Turkish Government regarding the transfer of part of the Baltic fleet to the Black Sea. The Wrangel fleet will eventually become a part of the Baltic fleet. If Turkey vetoes the plan, the soviet fleet will proceed to the Far East.

Kirejew, member of the military council of the Black Sea squadron, informed press representatives, after the close of the autumn maneuvers in Odessa, that in all probability a large number of warships would visit those countries with which Russia had friendly relations. Turkish ports would be visited first. He stated further that in the opinion of the Russian naval staff the rumors regarding Rumania's naval preparations were in no way unfounded, as they were in receipt of information to the effect that English naval experts were acting as advisors and that a fleet base would be established in Rumanian waters that would really serve English purposes.

Aviation

According to the Riga correspondent of the London Times, the Russian air force has made great progress during the past year, not only with the purchase of airplanes for the army and navy but also in the training of the personnel and the establishment of flying fields. At the beginning of July, 1925, the air fleet numbered 978 air and seaplanes in service; 625 of these were listed as observation planes, 296 as fighting planes, and 66 as bombing planes. They are arranged in divisions, each division consisting of 12 planes, including 4 reserves. In July the entire fleet numbered 98 divisions, of which only a very few were entirely complete. The majority were in European Russia, 32 in the Ukraine, 17 in the Caucasus, 17 in the Province of Moscow, 9 in the military district of Leningrad, and 5 in the wolga district. On July the personnel numbered 1,214 (784 flyers and 430 observers). Some of these are not accredited to the army at present and some are in the employ of foreigners (especially Germans) in Russian territory, but all are subject to military service should they be called on. The aircraft association has established 30 flying fields in various parts of the country; since last spring the army authorities have established 9 quite new military flying fields on the potential European-Russian front, and has equipped them in a thoroughly modern, up-to-date manner. The seaplanes have been organized into an actual fighting unit for the first time. At the present time there are 12 divisions for service in the Baltic, but they are far from complete and only numbered 60 airplanes. In the Black Sea there are about 100 airplanes, 65

of which are of the most modern type. Divisions for the Caspian Sea and Pacific Ocean are in process of formation. At the present time there are about 20 seaplanes on the coast of the Far East, and it is intended to organize 4 divisions in that district.

Military

It is probable that the contingent of the soviet army amounts to 1,000,000 instead of the 560,000 stated by Frunse. About 500,000 men are said to have taken part in the maneuvers in the Ukraine and in the neighborhood of Minsk. Frunse was commander in chief; the cavalry maneuvers were commanded by Budjenny. Six thousand pupils of military schools have been promoted as officers: 47 per cent of all the military pupils are Communists; 23 per cent belong to communistic organizations for young men, and 24 per cent are neutral. At the time of the promotions, Frunse said that the workmen and peasantry were the two pillars on which the army rested; this year's officers were better trained than their predecessors and they only needed a little assistance to get familiarized with their duties. According to a report of the "Tageszeitung" of Vienna, a great number of "Tcheka" agents have been dispatched to various countries in order to foment the Bolshevistic revolution, their approximate distribution being as follows: 20,000 in Germany, 16,000 in France, 12,000 in England, 14,000 in Poland, 1,200 in Austria, 2,300 in Hungary, 18,000 in China, 8,000 in America, and about 20,000 in different places. These men are equipped and paid by the soviets, a sum of half a million having been appropriated for that purpose in 1925.

The Stockholm "Tidningen" reports that the army budget for 1926 will be increased by 1,000,000,000 roubles.

Part of the Black Sea fleet is going to visit Turkish and Italian ports. The naval forces in eastern Asia are to be reinforced. The Black Sea fleet is developing great activity. The Rumanian coast is being constantly swept by its searchlights. Frunse is said to be satisfied with the results of the Baltic fleet maneuvers, but it is said in Riga that things did not run smoothly at all, especially among the commanding authorities.

Two systems of auxiliary guns will be introduced in the army—the Rosenberg system (180 kilograms to be drawn by two horses) and the Maklen system (336 kilograms). Both systems are provided with protective shields of 6 to 8 millimeters thickness and can be moved by hand during action. General Kotowsky, the commander of the Moldau cavalry corps, was murdered by his aide-de-camp.

General Borodin has assumed the post of counselor of the Chinese Canton Government.

The neighborhood of Minsk is being strongly fortified, aerodromes and barracks are being built. The military expenditures provided for in next year's budget amount to 1,134,000,000, which is equal to 16.3 per cent of the whole budget; these sums are intended especially for technical development and innovations.

The revolutionary movement in the region of Samarkand is said to have been crushed.

The Ukrainian language has been introduced into the artillery schools of Poltawa, Odessa, and Charkow; the military schools of Kiev, etc., are also to be Ukrainized in the near future.

In Moscow nine military contractors have been condemned to death and 32 to imprisonment for theft.

The military conscription of 1903 has been levied; the recruits have to serve two years in the infantry, four years in the cavalry and five years in the air forces.

SPAIN

NAVAL CONSTRUCTION

What has been accomplished by Spain in naval construction during the year 1925 and what still remains to be accomplished under the present naval program was recently outlined in the Spanish press. The writer shows that 1 cruiser, 2 destroyers, 1 small coast guard vessel, and 1 submarine have been delivered, and that there remain to be completed under the present naval program, 2 cruisers, 3 large destroyers, to be used as flotilla flagships, 21 submarines, and 1 school ship. He insinuates that the completion of the work is doubtful and urges that the Spanish naval program and budget be revamped.

VESSELS DELIVERED DURING YEAR

The vessels delivered during 1925 were the cruiser, *Blas de Lezo*, of 4,750 tons and mounting as a major armament 6 guns of 152-millimeters caliber (5.98 inches), the destroyers, *Velasco* and *Juan Lazaga*, of 1,164 tons and mounting 3 guns of 101 millimeters (3.97 inches), the coast guard vessel, *Dato*, and the submarine, *B–5*.

VESSELS LAUNCHED DURING YEAR

The following vessels were launched during 1925: The twin cruisers, *Principle Alfonso* and *Almirante Cervera*, of 7,976 tons with eight 152-millimeter guns and four antiaircraft guns each at

their principal batteries. They are 176.63 meters long (579 feet), this making them the largest ships in point of length in the Spanish Navy.

The destroyers, *Churruca* and *Alcala Galiano*, designed as flagships of destroyer flotillas, of 1,650 tons, mounting five guns of 120 millimeters (4.71 inches), and one antiaircraft gun, and built to develop a speed of 36 knots per hour.

The submarine, *B–6*.

VESSELS UNDER CONSTRUCTION

There are now under construction a third vessel of the same type as the destroyers *Churruca* and *Algal Galiano*, to be launched soon under the name *Sanchez Barcaiztegui*, and six submarines of the "C" series.

OLD VESSELS SOLD

Several antiquated units of the Spanish Navy have recently been disposed of by sale. The salvaged parts of the cruiser *Espana*, lost by being grounded off Cape Tres Forcas, North Africa, in 1923, were sold for 9,000,000 pesetas over the cost of the salvaging operations. The destroyers *Terror*, *Pelayo*, *Audaz*, and *Villa de Bilbao* have been sold at auction and the destroyer *Osado*, and the coast survey ship *Urania* have been retired from service.

SWEDEN

RESTRICTIONS ON USE OF CAMERAS IN AIRPLANES

Rules for the carrying of cameras in Swedish airplanes, recently published, include the following regulations:

Cameras which are carried on the journey but which will not be used en route must be contained in a sealed cover and surrendered to the pilot of the machine, who will keep them in special lockers.

Permission may be obtained from the chief of the general staff to take pictures during the journey but these must be censored afterwards by the general staff before they can be sold, published, or publicly displayed. Permission to use a camera on board an airplane is granted usually only to Swedish subjects.

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Washington, D. C.

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1926

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OFFICE OF NAVAL INTELLIGENCE

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VOL. VIII, NO. 10—APRIL, 1926

FOR CONVENIENCE IN ROUTING

Officer	Initials	Date received	Date forwarded
Captain			
Executive Officer			
First Lieutenant			
Navigation Officer			
Gunnery Officer			
Communication Officer			
Engineer Officer			
Medical Officer			
Supply Officer			
First Division Officer			
Second Division Officer			
Third Division Officer			
Fourth Division Officer			
Fifth Division Officer			
Marine Officer			

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1926
April

The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

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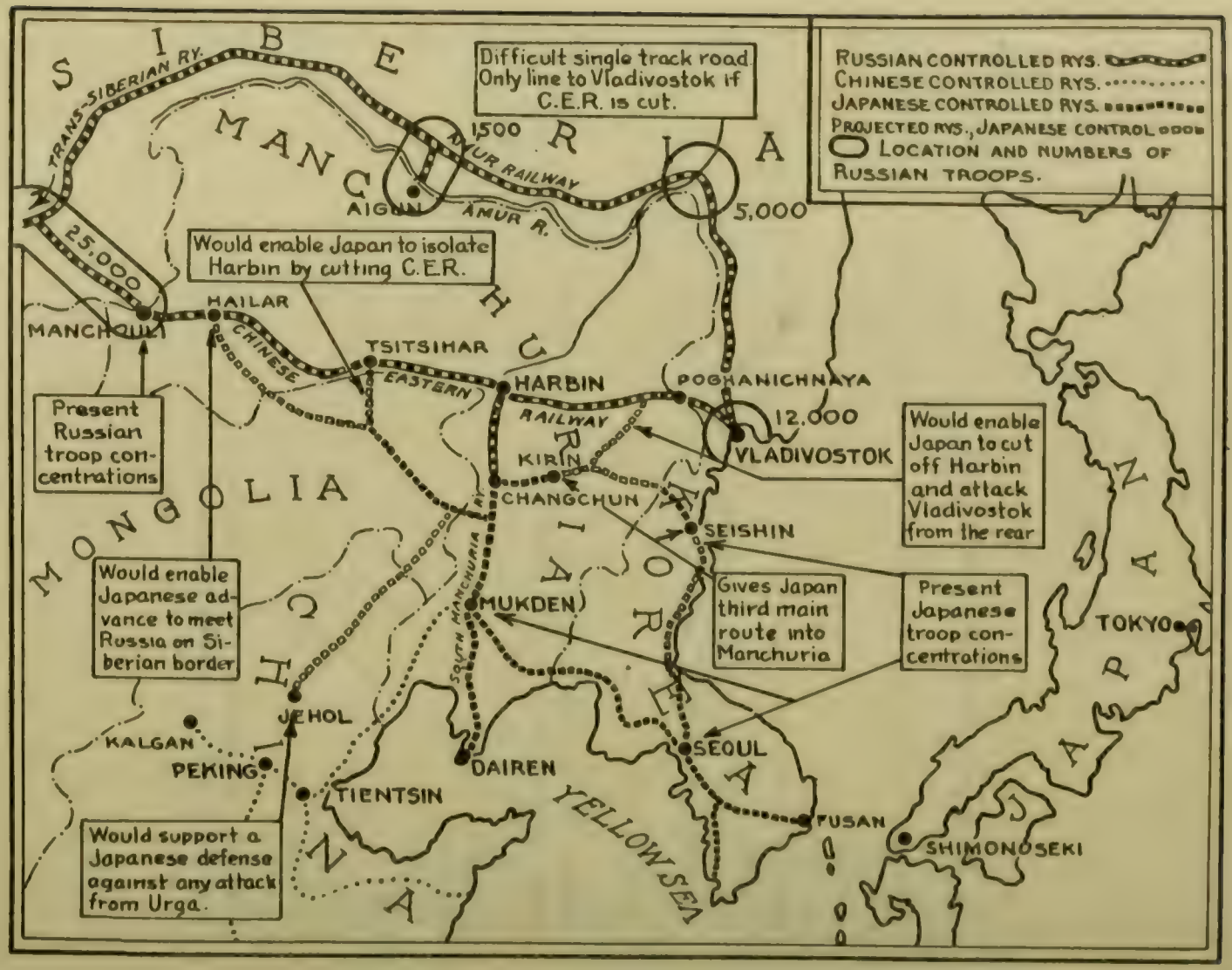
SIBERIA
TRANS-SIBERIAN RY.
MANCHURIA
AMUR RAILWAY
AIGUN
AMUR R.
1500
5,000
25,000
Difficult single track road
Only line to Vladivostok if
C.E.R. is cut.
RUSSIAN CONTROLLED RYS.
CHINESE CONTROLLED RYS.
JAPANESE CONTROLLED RYS.
PROJECTED RYS., JAPANESE CONTROL
LOCATION AND NUMBERS OF
RUSSIAN TROOPS.
Would enable Japan to isolate
Harbin by cutting C.E.R.
HAILAR
MANCHOULI
CHINESE EASTERN RAILWAY
TSITSIHAR
HARBIN
POGRANICHNAYA
12,000
VLADIVOSTOK
KIRIN
CHANGCHUN
SEISHIN
MUKDEN
KOREA
Present
Russian
troop con-
centrations
Would enable
Japanese ad-
vance to meet
Russia on Si-
berian border
Would enable
Japan to cut
off Harbin
and attack
Vladivostok
from the rear
Gives Japan
third main
route into
Manchuria
Present
Japanese
troop con-
centrations
MONGOLIA
SOUTH MANCHURIA
JEHOL
KALGAN
PEKING
TIENTSIN
DAIREN
SEOUL
FUSAN
TOKYO
SHIMONOSEKI
JAPAN
YELLOW SEA
CHINA
Would support a
Japanese defense
against any attack
from Urga.

CONFIDENTIAL

O. N. I. MONTHLY INFORMATION BULLETIN

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ASIA

THE RUSSIAN-JAPANESE SITUATION

[Prepared by O. N. I., March, 1926]

Russia in her slow march eastward finally acquired Siberia and claimed the northern part of the Kuril Islands and Saghalin. She took by force from the Manchus territory that had always paid tribute to China. A seaport was soon realized to be necessary. Petropavlovsk, in Kamchatka, and the mouth of the Amur River were tried in turn and found unsatisfactory due to ice throughout a large part of the year. Vladivostok was then determined upon as the port and future naval base on the Pacific. In 1891 construction of the Trans-Siberian Railway, talked of for 30 years, was begun and Peter the Great's dream of an Asiatic Empire appeared to be materializing. But by 1898, when the railroad was opened, the dream had expanded. Vladivostok was a good port, but ice closed it during several months of the year. The ice-free ports on the Liaotung Peninsula and in Korea were more desirable.

After the restoration came the change in Japan's policy; when she looked outward she saw near-by and claimed Saghalin and the Kuril Islands. Finally an agreement was reached whereby she kept the Kurils and Russia took Saghalin. Korea, under foreign domination, was also too close for comfort. China had for many years claimed it and maintained a sort of loose sovereignty over it. But when Russian influence and intrigue became apparent in this quarter Korea became "a sword pointing at Japan's heart." Under one pretext or another war was declared on China in 1894. Korean independence was established, and Japan was demanding the Liaotung Peninsula when, in 1895, Russia, with the aid of Germany and France, stepped in and forced Japan to relinquish this claim.

For this service Russia obtained, in 1896, the right to build a railway across Manchuria to Vladivostok (the Chinese Eastern) with a branch from Harbin to Port Arthur (now the Chinese Eastern from Harbin to Changchun and the South Manchurian from Chang-

chun to Dairen). In 1898 Russia secured from China a 25-year lease of this same Liaotung Peninsula. In 1903 the road was opened and the desire for an ice-free port was realized. But the dream apparently called for more, as was shown during and after the Boxer revolt, when Russia, deceiving the other powers, took possession of all of Manchuria and presented demands that clearly indicated she would never voluntarily relinquish her hold. The intrigue and efforts to strengthen her position in Korea had continued to the point of sending disguised troops there in 1904, when Japan called a halt and the war resulted.

The outcome was the temporary fading of Russia's dream of an Asiatic Empire. Japan struggled hard at Portsmouth for all of Saghalin but got only half. All foreign influence was driven from Korea and later it was annexed by Japan. The Liaotung lease and Russia's special rights in South Manchuria, including that branch of the railway, were acquired. But the real opportunity for Japan to show her hand came with the Great War. Her dream of Asian hegemony, like Russia's, appeared to have expanded with time. Her outstanding acts were: The attempt to acquire former German rights in Shantung; forcing China to accept the 21 demands, which included a 99-year extension of the Liaotung lease; establishment of army posts throughout China; attempts to gain control of the Chinese Eastern Railway; disregard of the Allied agreement in connection with the occupation of Siberia, etc.

In connection with this occupation it will be recalled that Japan agreed with the other nations concerned to send not over 7,000 troops and actually sent about 70,000. She took possession of Siberia east of Lake Baikal and south of the mouth of the Amur as well as the northern half of Saghalin. If reports are correct, she double crossed the Allies at every turn, entering into secret negotiations detrimental to their interests, etc. But eventually the tide of Sovietism, public condemnation, and the Washington Conference swept her out. Even her efforts to form and control a buffer state were frustrated.

Then followed the recent Russo-Japanese treaty. Why Japan desired it is not clearly understood and probably one guess is as good as another. It will be recalled that at that time China and Russia had come to terms, there was every indication that Great Britain and France would soon follow, pressure was being brought in the United States toward the same end, American interests had obtained vast oil concessions in northern Saghalin, and Japan, already hated throughout Siberia, was apparently being left in an isolated position. At any rate the treaty was signed, but since that time relations have not improved; in fact, the tension has increased to such a point that some drastic change may be expected at any time.

Recent occurrences in China are too close at hand to properly evaluate their entire significance, but a few aims stand out in clear relief. Among these are: Russia's unquestioned efforts to foment uprisings throughout China in the hope of ridding it of all foreign influence and enterprise; her opposition to Japanese influence in Manchuria; her efforts to strangle the South Manchurian Railway and Dairen; and her determination to hold absolute control of the Chinese Eastern Railway. Prior to signing the treaty with China, Russia had occupied Mongolia and established there an autonomous government. Although the troops have since been withdrawn, she continues to hold and consolidate her absolute control over this Province, which extends almost to Kalgan, a distance of only about 300 miles from the sea. She has already made surveys for a railway from Verkne to Urga. She has supported and supplied Feng Yu-hsiang in his recent attempt to gain control of North China from Kalgan to the Gulf of Chihli. It is possible that her eyes have turned to a warm-water port in this gulf or even to Tsingtao, thus by-passing southern Manchuria, which might account for the backing of Feng. She has established preferential freight rates on the Chinese Eastern Railway in an effort to divert shipments from the South Manchurian Railway and Dairen to Vladivostok. She has officially protested the granting of new railway concessions in North Manchuria to Japan. Her recent attempt to suspend traffic on the Chinese Railway from Harbin to Changchun was either an effort to completely shut off freight to the South Manchurian Railway, or to create a pretext for sending troops into northern Manchuria in the guise of railway guards, or both. It is believed in many quarters that Russia supported Kuo Sung-lin in his recent attempt to overthrow Chang Tso-ling in Manchuria, hoping thereby to undermine Japanese control of this territory, including the cancellation of railways concessions, etc.

Japan on the other hand has made it clear to everyone that she will tolerate no interference with her special interests in Manchuria. But just what she considers these special interests to be has not been made so clear. The term has been expanded to include "Special interests in Mongolia." Japan has invested little capital in Mongolia, so it appears that the "protection of special interests" probably means the exclusion of all other foreign interests. And she has taken the necessary steps to assure this "protection." During the recent fighting in Manchuria she sent sufficient troops there to enforce her benevolent neutrality toward Chang Tso-lin, which precluded any possibility of his defeat, and the resultant undermining of her influence. She is completing the strategic railway along the east coast of Korea through Seishin to the Manchurian border, and has obtained concessions for the continuation of this

line to Kirin with a branch running north to the Chinese Eastern Railway just west of Pogranichnaya. She has nearly completed the Taonan Fu-Tsitsihar line and has a concession for a branch from this line to the northwestward, striking the Chinese Eastern Railway at Hailar. She has another concession for a line from Changchun to Jehol. The lines that tap the Chinese Eastern Railway west of Harbin pass through the most productive bean district in Mongolia. By preferential rates they will be able to divert all this freight (which is the chief source of revenue for the Chinese Eastern Railway) to the South Manchurian Railway and Dairen. This will be a serious blow to the Chinese Eastern and Vladivostok. In addition, all of the new lines are of great strategic importance for the movement of troops.

This struggle for supremacy can not continue forever; either one or both countries must alter their policy. Japan will not willingly consent to Russia getting an ice-free port and, at the same time, cutting her off from the rear; nor will she meekly stand by and watch the South Manchurian Railway and Dairen dwindle in importance and as a source of revenue. There are rumors aplenty that she expects, is preparing for, and will welcome another war with Russia. Such a war would most likely end in her favor and be the means to additional concessions. If Russia can not get an ice-free port (to what extent she will go to get it is a question), then Vladivostok must be developed. At present the Chinese Eastern Railway is not only one of the greatest sources of revenue to the Government, but is also the means by which Vladivostok can be and is being developed, and it is hard to believe that she will permit the importance of this line to be destroyed without a struggle. She has stationed a considerable number of troops at various points along the northern border of Manchuria, but the concensus of opinion is that she does not relish the prospects of a war with Japan. If defeated, it would probably mean the end of Soviet rule in addition to material losses. Serious revolts throughout China would serve Russia's purposes better.

There is, however, the possibility of another solution that might be resorted to. It is an agreement between the contestants to peaceably divide the spoils of China. This is not impossible. It will be recalled that, in 1907, soon after their war, when Russia and Japan were faced with the acceptance by European countries of the "open door" policy, they soon forgot their differences and cooperated to prevent other foreign intrusion into their special spheres. Again a few years ago, when it was proposed to internationalize the railways in Manchuria, the Japanese and Russian Governments promptly came to an agreement and presented a united front in opposition to the other interested powers.

China, in its present state, is impotent to forcibly oppose any move of the avaricious contestants. It is unlikely that any foreign power or combination of foreign powers will protest the acts of either contestant to the extent of declaring war upon them. They are apparently free to push on their respective schemes to the point of conflict, then settle the differences as they see fit. The only probable deterrent force seems to be the Chinese boycott.

CHILE

BRITISH NAVAL OFFICERS LOANED TO CHILE

[From the British press]

The British Navy list for March reveals the composition of the mission which has been lent for duty with the Chilean Navy, and which has just arrived at Valparaiso. It was during the visit of the Prince of Wales to this port last September that public reference was first made to the appointment of this new mission. It was then stated that the Chilean authorities cherished great hopes that the occasion of the Prince's visit might have concrete results in connection with the proposed loan of British officers. The latter would not meet as a committee it was added, "but would be attached individually to departments for a period of at least five years."

Commander W. L. Jackson, D. S. O., is the gunnery specialist of the mission, and has just relinquished the post of experimental commander at Whale Island. He was promoted in June, 1923, after being gunnery officer of the battleship *Revenge*. Commander G. H. Cresswell, D. S. C., both during and since the war has commanded destroyers, and was promoted in December, 1924, while in the *Vivacious* in the Mediterranean. Lieut. Commander G. A. Garnons-Williams, D. S. C., is a submarine commander, of which type of vessel the Chilean Fleet has six, built for Great Britain in 1915 in America, but transferred to Chile after the United States Government had interned them at Boston. Lieut. Commander J. A. Bickford-Smith is a torpedo specialist, late of the *Vernon* staff.

DENMARK

AVIATION

[Source reliable]

Naval

The Naval Air Service is directed by a chief (naval officer with the rank of captain or commander), who is directly under the Navy Department.

THE HYDROPLANE STATION

The air service has stations for seaplanes in Copenhagen (main station) and in Slipshavn (Great Belt).

Land planes (chasers and school planes) are stationed in Copenhagen's aerodrome (Kastrup).

MATERIAL

The material consists of scouting planes, chasers, and special material, such as airplanes for school use, surveying, fishery inspection.

H. M. I. hydro-monoplanes, with 165-horsepower O. V. engines are used as scouting planes. Maximum velocity, 165 kilometers.

The engines as well as the airplanes are constructed at the naval station, which on the whole as far as possible is used for constructing the air service's material.

Chasers, L. B. II type (Danecock) with 400-horsepower Jaguar motor.

For school purposes the Avro 504–K and 504–N, with 100-horsepower Gnome and 180-horsepower Lynx engines, are used.

Some of the airplanes are bought in England and some are constructed at the naval station.

For surveying, fishery inspection, etc., the hydro-biplane (H. B. II) of the German Friedrichshafen type (200-horsepower Benz motor) is used.

PERSONNEL

The personnel of the air service consists of aviators, observers, technical personnel, and station men.

A. As aviators the permanent personnel within the navy is used.

B. As observers only officers are used.

C. The technical personnel consists (besides the head of the air service's engineer council) of the navy's first machinists with special mechanical training and the aviation mechanics, trained in the air service, and who are in active service.

TRAINING

A. The school of aviation lasts about 12 months and consists of a theoretical course of 5 months and a practical course of 7 months. The elementary aviation training is according to the "gasportske" system with Avro school planes.

B. The school for observers lasts three months and is both theoretical and practical. As the pupils are officers, greater stress is placed on the practical training.

C. The aviator mechanic school lasts about 12 months and is both theoretical and practical. The conditions for entry are machine, technical training, and apprentice credentials.

TACTICAL DIVISION

The material and the personnel are arranged in groups of three airplanes. Several groups form a squadron.

When one or more groups are practicing with the fleet in Danish waters away from Copenhagen, an air depot ship, which is controlled by the group or squadron chief, is attached to the air group (squadron).

Military

The army aviation corps consists of:

The management, which is controlled by the general staff and the aviation school.

The chief of the corps is a colonel or lieutenant colonel. Besides there are 3 captains, 4 first lieutenants, 1 staff officer, 2 noncommissioned officers (one of these acts as paymaster), and 1 sergeant.

The personnel is divided in the following manner: In the management of the corps, there are 2 captains or first lieutenants and 1 staff officer.

The rest are permanently in service at the aviation school, the chief of which has been specially assigned by the King. The chief may remain in this position for 10 years.

For replacing permanent men in the lines and the reserve, who in case of mobilization leave the army to join the aviation corps, there are: 4 captains of the reserve, 16 naval lieutenants of the reserve, and 12 sergeants of the reserve, who are kept above the number of men of the reserve registered in the army regulations.

The flying corps personnel are generally chosen from volunteers subject to military duty, both officers as well as privates.

Those who are accepted must agree to altered designations as to duration of training, be ready to be called in for continued practice, etc. These designations have not as yet been made.

The designation of the school of aviation is to train volunteers of the army as aviators, observers, and bomb throwers; to follow the development of the air service, and to make experiments.

The pupils are to be between the ages of 18 to 30 years and are chosen after an application and a doctor's certificate.

During the period of April 1 to October 1 the pupils are instructed in practical aviation, observation, machine-gun practice, and sharp shooting on the ground; sports and gymnastics and rifle practice, as well as technical studies in aviation.

During the period of October 1 to October 1 of the next year the pupils are instructed in practical flying, observation, air combats, wireless telegraphy and telephony, photography, sharpshooting, practical practice in artillery observation and infantry flying; gymnastics, sports, and rifle practice.

At the school there will also be arranged a course of instruction for the purpose of giving permanent officers of the lines a knowledge of the army air service in general.

Sergeants of the reserve who are aviators and who have satisfactorily passed a special training in the air service may be given the rank of second lieutenants.

Places for noncommissioned officers in the aviation corps are filled by noncommissioned officers of the army, who have at least two years' service in the ranks; the other places for the commanders of the noncommissioned officers' group are filled by commanders of the army's noncommissioned officers' group or by advancement within the corps.

Places for officers in the aviation corps are filled either by officers of the army, of the ranks in question, or by promotion within the corps.

Such officers within the corps who are not advanced within same participate in promotions in the army and leave when the promotion takes place.

Army aviators have "extra pay" of 9.50 kroner per day. The "extra pay" decreases and increases according to the increase in living expenses.

Flying material

Number	Name	Type	Engine	Speed per hour	Ceiling	Fuel for—
				Kilometers	*Meters*	*Hours*
6	Potez XV	Scouting	400 horsepower Lorraine-Dietrich	180	5,000	4
8	Fokker C. L	Transfer plane	220 horsepower B. M. W	175	7,000	5
5	Fokker C. V	do	400 horsepower Lorraine-Dietrich	180	6,000	7
2	Fokker S. III	School planes	120 horsepower Mercedes	110	3,000	7
4	L. V. G. B. III	do	do	110	4,000	3

Annual budget 1,000,000 kroner.

Civil

The treatment of the question regarding civil aviation has been assigned to the ministry of public works, airplanes being regarded as means of transportation, and aviation as affairs of transportation. This is also the case in most foreign countries.

As this ministry does not as yet possess employees who have been trained in the technique of aviation, a temporary arrangement has been made with the ministry of war and ministry of the navy, so that the aviation school of the army and the navy's hydroplane station both assist the ministry in inspecting the civil airplane traffic in such a manner that the inspection takes place in the name of the ministry, and the institutions concerned are placed under the ministry for public works.

An advisory board, the air traffic commission, has been appointed to assist the ministry.

The commission has answered all such questions concerning air traffic which have been directed to the ministry (mainly permits for furthering air traffic), and it has also assisted the ministry in negotiating with other countries concerning air traffic conventions, etc.

Further, the ministry has appointed a field council which will have charge of the administration of the new airdrome at Kastrup, as well as some other land which has been appropriated for an airdrome but not as yet registered as an aviation field.

This land consists of 315 hectares, 70 hectares being already in use as an aviation field.

After the aviation field had been laid out, fenced in, drained, and grass seed planted (the sum of 200,000 kroner appropriated for this purpose), the planning of the airdrome itself was taken up (appropriation, 450,000 kroner). An expedition and administrative building was built, with rooms for customs authorities, state police, a waiting room for the public, baggage rooms, conference room, rooms for air-traffic companies, etc., besides a small janitor's apartment, and a hangar with repair shop and stationary workshop machines, a mechanics' mess room and aviators' mess room, oiling station, etc. Further, the old powder station, situated on the aviation field, was replaced by a hotel and restaurant, 118,000 kroner being appropriated for this.

Concerning the traffic on the field, it may be said that the field, which was opened last spring, has been used by the Danish Air Traffic Co. (Det Danske Luftfartsselskab) which, in accordance with a four years' subsidy from the state amounting to 250,000 kroner per annum, and a four years' subsidy from the municipality of Copenhagen of 100,000 kroner per annum, has operated the routes Copenhagen-Hamburg and Copenhagen-Berlin, cooperating with the German company, Aero Lloyd, besides a Copenhagen-Hamburg route alone. These routes are operated with five-passenger Fokker planes. The company has also made flights Copenhagen-Amsterdam-Paris, with a four-motor Farman plane for 12 passengers.

The Royal Dutch Co., as well as the German Aero Lloyd Co., have used the field in operating the Copenhagen-Rotterdam route, likewise with Fokker planes.

Further, the German Junkers Co. has operated a route Copenhagen-Berlin with one-engine Junkers planes, and the Swedish Aero Transport has landed in Copenhagen on its Malmo-Hamburg-Amsterdam route. with its three-engine Junkers planes.

With regard to the administration of the field, an agreement for the summer of 1925 was made between the field council and the Danish Air Traffic Co. to the effect that the company took charge of the daily administration of the field as well as the inspection of the field for

the field council. The question of forming an independent field administration is being taken up, as well as—

1. A bridge system for hydroplanes.

2. A new hangar.

3. Installation of a wireless station for exclusive use of the air traffic for traffic and weather reports.

FRANCE

RÉSUMÉ OF NAVY APRIL 1, 1926

[Prepared by O. N. I.]

I. Naval Policy—Plans and Projects—Building Programs

1. French naval policy is based upon the fact that, although France does not possess a relatively powerful force of capital ships, at the same time, with her light forces and submarines backed by a powerful air force, she hopes to make it impossible for large surface ships to dominate the western Mediterranean. Therefore it will be possible for France to keep open her lines of communication between southern France, Corsica, and northern Africa for the purpose of transporting troops and supplies.

2. To this end, the French program of Naval development appears to be along the following lines:

(*a*) Replacement of obsolete light forces and submarines with modern ships.

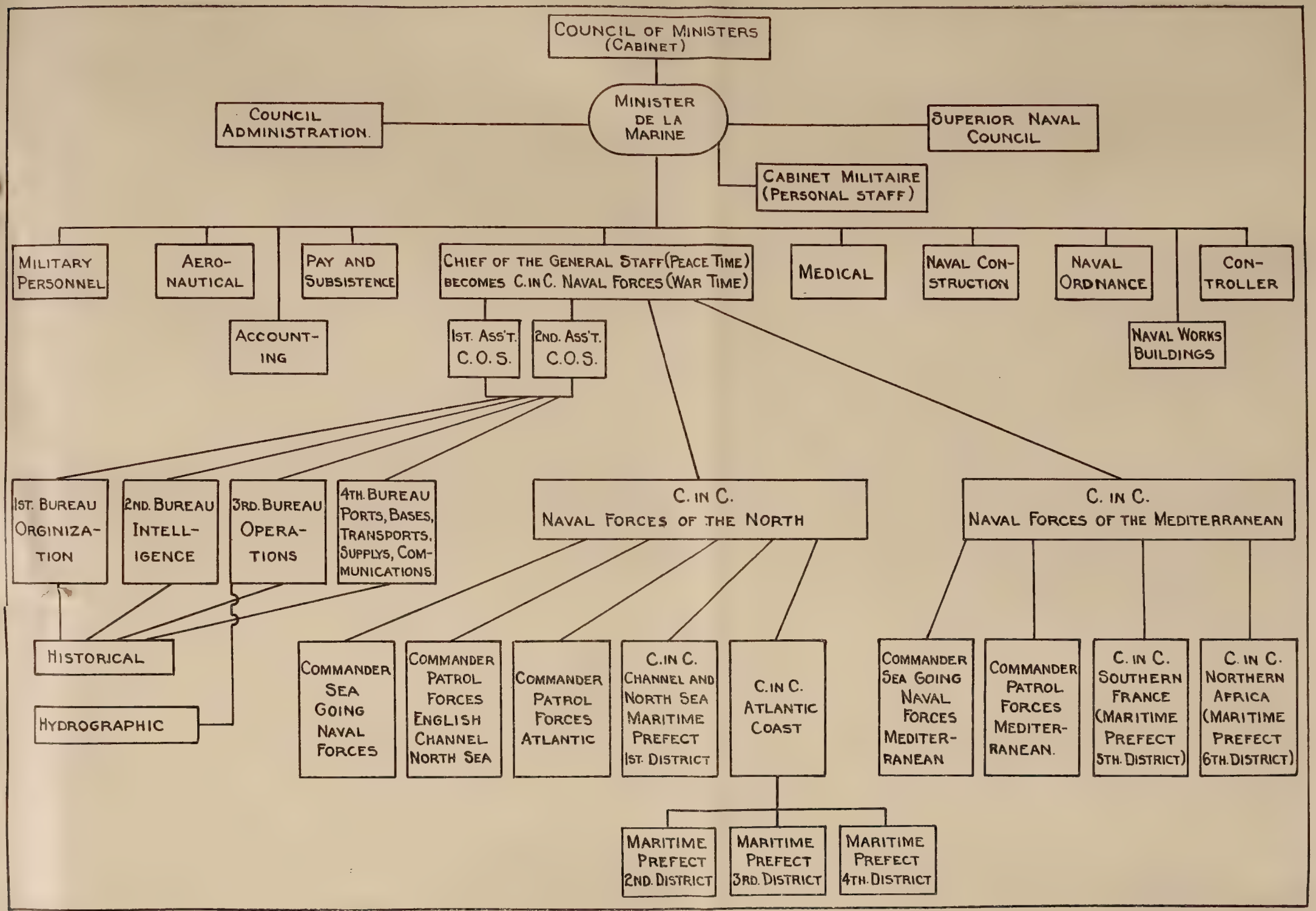
(*b*) Increasing the numbers of light forces and submarines.

(*c*) Execution of a restricted program of coast defense.

(*d*) Increasing the development of naval aviation.

(*e*) Modernizing the few remaining battleships.

3. France has a heavy building program for light forces as indicated below. The ships which have been authorized to be laid down in 1926, 1927, 1928, and 1929 are shown. Appropriations have not as yet been made for these ships. The 1925 program has been appropriated for.


COUNCIL OF MINISTERS (CABINET)
MINISTER DE LA MARINE
COUNCIL ADMINISTRATION.
SUPERIOR NAVAL COUNCIL
CABINET MILITAIRE (PERSONAL STAFF)
MILITARY PERSONNEL
AERO-NAUTICAL
PAY AND SUBSISTENCE
CHIEF OF THE GENERAL STAFF (PEACE TIME) BECOMES C. IN C. NAVAL FORCES (WAR TIME)
MEDICAL
NAVAL CONSTRUCTION
NAVAL ORDNANCE
CONTROLLER
ACCOUNTING
1ST. ASS'T. C.O.S.
2ND. ASS'T. C.O.S.
NAVAL WORKS BUILDINGS
1ST. BUREAU ORGINIZATION
2ND. BUREAU INTELLIGENCE
3RD. BUREAU OPERATIONS
4TH. BUREAU PORTS, BASES, TRANSPORTS, SUPPLYS, COMMUNICATIONS.
C. IN C. NAVAL FORCES OF THE NORTH
C. IN C. NAVAL FORCES OF THE MEDITERRANEAN
HISTORICAL
HYDROGRAPHIC
COMMANDER SEA GOING NAVAL FORCES
COMMANDER PATROL FORCES ENGLISH CHANNEL NORTH SEA
COMMANDER PATROL FORCES ATLANTIC
C. IN C. CHANNEL AND NORTH SEA MARITIME PREFECT 1ST. DISTRICT
C. IN C. ATLANTIC COAST
COMMANDER SEA GOING NAVAL FORCES MEDITERRANEAN
COMMANDER PATROL FORCES MEDITERRANEAN.
C. IN C. SOUTHERN FRANCE (MARITIME PREFECT 5TH. DISTRICT)
C. IN C. NORTHERN AFRICA (MARITIME PREFECT 6TH. DISTRICT)
MARITIME PREFECT 2ND. DISTRICT
MARITIME PREFECT 3RD. DISTRICT
MARITIME PREFECT 4TH. DISTRICT

91060—26. (Face p. 11.)

Building: Authorized and appropriated for, and authorized but not appropriated for

Types	Building	Authorized and appropriated for	Authorized but not appropriated for			
		1925	1926	1927	1928	1929
	Number of units	*Number of units*	*Number of units*	*Number of units*	*Number of units*	*Number of units*
CV—Aircraft carriers, first line	1	1				
CL—Light cruisers, first line	5	1	1	1	1	
DD—Destroyers, first line	18	4	4	4	4	2
DL—Destroyer leaders	5	3	3	3	3	3
CM—Mine layers, first line		1			1	
SC—Cruiser submarines			1		1	
SS—Submarines, first line	11	7	5	5	6	5
OSS—Submarines, second line	12					
SM—Mine-laying submarines, first line		2	1	1	1	1
AO—Oil tankers	1	Four between 1925 and 1928				
AS—Submarine tender			1			

NOTE.—In connection with an estimate of the situation in the matter of foreign naval policies, attention is invited to the fact that France has not as yet confirmed by legislative action Treaty No. 2 of the Washington Conference with regard to the use of submarines and noxious gases in warfare and that therefore this treaty is not as yet binding on any of the nations concerned.

II. Organization—National, Departmental, Fleet, Shore Establishments, and Coast Defense

4. The present French Government is a Republic based upon the representative system. The President of the Republic is the head of the State. It is a position of great dignity, but little power, similar to that of the King of England. The President appoints the Prime Minister, who selects his ministers to form the cabinet. the Prime Minister is president of the council (cabinet) and actually the head of the Government. (See diagram.) The cabinet collectively is responsible for the general policy of the Government and in practice is the executive power. No one person (neither the President of the Republic nor the Prime Minister) is authorized to give orders to the head of an executive department who is subject only to the orders passed by the council of ministers or cabinet as a whole. Any order of the President of the Republic, to be legal, must be countersigned by a minister. This assures legislative control, since ministers comprise the cabinet, which is responsible to Parliament.

5. Distinct from the cabinet, but comprised of some of the cabinet members, is the Council of National Defense (Conseil Superieur de la Defense Nationale), which body is charged with the organization of the entire nation for war and is composed as follows: The Prime Minister, the Minister of Foreign Affairs, the Minister of the Interior, the Minister of Finance, the Minister of War, the Minister of the Navy, the Minister of Public Works, the Minister for the

Colonies, the vice president of the Army War Board (Conseil Superieur de Guerre), the vice president of the Navy War Board (Conseil Superieur de la Marine).

6. The head of an executive department and member of the council (cabinet), such as the Minister de la Marine, is responsible for his own department to the cabinet. The naval command includes the forces afloat, the naval districts, and the coast defense.

7. Naval administration may be classified under the three following subdivisions:

(*a*) The central administration in Paris.

(*b*) The administration of the naval districts, ports, and establishments at home and abroad.

(*c*) The administration of the naval forces.

8. Organization of the Ministry de la Marine (Navy Department), the central administration in Paris.

(*a*) The Minister of Marine is the supreme head of the navy. He may be either a naval officer or civilian. He need not necessarily be either a senator or deputy, though while holding office he becomes "ex officio" a member of both houses and takes part in their debates on any subject of naval interest.

The minister has a personal staff, which comprises the Cabinet Militaire under the Chef de Cabinet, who is a naval officer, at present a vice admiral. He is in charge of the secretariat and the various smaller civil departments.

(*b*) The Council Administration is instituted under the presidence of the Minister of Marine to consider broad questions of administrative policy. It is composed of the following: The chief of the general staff, the Chef du Cabinet (who is also the Directeur du Personnel de l'Administration Centrale), director of military personnel, the director of Air Service, the director of naval construction, the director of naval ordnance, the director of the "Intendance Maritime" (pay and subsistence), the medical director, and the accountant general.

(*c*) The Superior Naval Council is a consultative body especially charged with furnishing reliable opinions on questions pertaining to war on the sea and the defense of the coasts. The composition of the council is as follows: The Minister of Marine, president, the chief of the general staff, vice president, the two vice admirals designated for the chief commands of the naval forces of the north and of the Mediterranean, the vice admiral, commander in chief Mediterranean Squadron, the vice admiral, appointed to exercise in time of war command of the Atlantic coast; a vice admiral, on duty in Paris, selected by the minister.

OTHER GENERAL OFFICERS APPOINTED BY THE MINISTER

NOTE.—For consultation the flag officer commanding the Naval War College and the two assistant chiefs of the navy general staff are members of the council. For consultation the chief of the general staff of the army and one other member of the superior military council designated by the Minister of War are members.

The Superior Naval Council must be consulted on all vital subjects, as follows:

1. General organization of the Navy.
2. Recruiting, training, and employment of the officer and enlisted personnel.
3. General organization of the coast defense.
4. Naval programs.
5. General characteristics of the various units to be contracted for including air planes and dirigibles.
6. Battle tactics of naval forces.
7. Creation, extension, or suppression, of navy yards, bases for the fleet, and coast defense works.

(d) Departments of the Ministry of Marine

The Ministry of Marine is divided into the following departments:

1. The General Staff, which comprises, first bureau organization; second, bureau intelligence; third, bureau operations; fourth, bureau ports and bases, transports, supplies, and communications; together with two attached services—historical service, hydrographical service.
2. Aeronautical service.
3. Personnel service.
4. Centrale de l'Intendance Maritime (pay and subsistence).
5. Direction Centrale du Service de Sante (medical).
6. Direction des Constructions Navales (construction).
7. Direction Centrale de l'Artillerie Navale (ordnance).
8. Direction de la Comptabilite Generale (accountant general's department).
9. Direction du Controle (exchequer and audit department).

(e) The General Staff of the Navy

Organized along similar lines to that of the general staff of the army.

The guiding principle which has prompted the various organic decrees of the Superior Council of War and the general staff of the army, and which has been fully confirmed by the experience of war,

is that the general officer designated for commander in chief of the French forces in time of war should be placed in time of peace at the head of the general staff of the army.

Applying this principle to the navy results in the designation in time of peace of the chief of the general staff (vice admiral), who in time of war becomes commander in chief of the naval forces of France and who assumes the general direction of naval operations in conformity with instructions from the Minister of Marines, following the orders of the Government.

This flag officer is responsible for all that concerns preparation for naval warfare to include forces afloat, naval aviation, and coast defense.

Under the vice admiral, chief of the general staff, are placed the directors and chiefs of central administrative bureaus for all that concerns coast defense, mobilization, and armament of the fleet and the naval air service. He keeps closely in touch with flag officers afloat and with the directors of the matériel and personnel services.

He personally directs the work of the general staff.

A ministerial order of February 29, 1920, reorganized the staff on the basis that the directing staff must be clearly separated from the executive services. The nomenclature of the sections of the staff was changed, and is now the same as that in force in the Ministry of War.

To each "bureau" constituted by the order a certain number of officers from the matériel and personnel sections are attached for "service courant," their mission being to assure liaison between the staff and the executive services. They are clearly separated from those officers whose duties are the preparation of war plans. The ministerial view was that the particular nature of the material used by the navy necessitated constant liaison between the preparatory department, i. e., the matériel and personnel sections and the utilizing department, i. e., the staff. To insure that officers were not overwhelmed with current work this clear distinction was drawn in each bureau. The distinction was carried further by the appointment of a second assistant chief of staff. The first assistant chief of staff is responsible for current work, the second assistant chief of staff directs the study of questions undertaken by the bureaus in accordance with the orders of the chief of staff.

The staff is constituted as follows:

First Bureau—Organization

(*a*) Personnel subsection. Organization and study, recruiting, utilization, and mobilization of personnel.

(*b*) Matériel subsection. Naval program, naval dispositions and mobilization as regards matériel. Composition of the fleet,

examination of projected designs and reports of trials. Organization of "Services offensifs et defensifs" (coast defense) as regards matériel. Artillery for sea service and coast defense. Protection against mines and torpedoes, barrage and net matériel, swept channel organization. Study of submarines and submarine weapons. Naval aviation, protection against aircraft, utilization of aircraft for operations at sea and for coast defense.

(*c*) Inventions subsection. Inventions generally.

(*d*) Current questions subsection. Upkeep of effectives. Vessels under the orders of the Prefects Maritimes for trials, repairs or in reserve. Current questions relative to projected or finished vessels or to vessels under trials.

Staff: One captain or commander, chief of bureau; 10 other officers.

Second Bureau—Intelligence

(*a*) Current questions and cypher subsection. Relations with foreign naval attachés, missions abroad and in France. Admission of officers into the schools. Passports, protocole. Cryptography and accountancy of secret documents.

(*b*) Intelligence subsection. The obtaining of information, liaison in this connection with French Naval attachés. Secret service and secret service relations with other departments of state. Economic documentation on maritime countries.

(*c*) Foreign navies subsection. Utilization of information obtained as to foreign navies. Military and political documents on all maritime countries.

(*d*) Legal and international law subsection. Questions of international law and legal questions referred to the staff. Prizes and foreign merchant ships.

Staff: One captain or commander, chief of bureau; 8 other officers.

Third Bureau—Operations

(*a*) Preparation of war orders and maneuvers subsection. Study of former wars and their teachings. Preparation of war orders (in conjunction with the second bureau). Training of the naval forces.

(NOTE.—Two officers are attached for liaison with the aeronautical service).

(*b*) Movements and current questions subsection. Upkeep of the fleet and repairs to the fleet and to matériel. Liaison with the hydrographical service.

Staff: One captain or commander, chief of bureau; 7 executive officers, 1 engineer officer.

Fourth Bureau—Ports and bases, transports, supplies, and communications

(*a*) Ports, bases, and supplies subsection. Arsenals, buildings, matériel, salvage, organization of war bases as regards matériel. Fuel, transports, colliers, oilers, and refrigerator ships from the matériel and upkeep side. Current questions on these points.

(*b*) Transports subsection. Coast and hospital transports, as regards movements and traffic. Shipwreck and stranding. Mobilization of the commercial fleet. Marine insurance, pilotage, fishery protection and current questions on these points.

(*c*) Communications subsection. Communications and liaison on water transportation questions with other departments of state and with the other bureaus.

Staff: One captain or commander, chief of bureau; 8 other officers.

The annexed "Services" are as follows:

Historical service.—The historical service has liason with all four bureaus. It is under the authority of the chief of the general staff. It is divided into three main divisions—historical service proper, archives and libraries, and an administrative section. The semi-official revue maritime is prepared in this section and the naval museum at the Louvre is now under its direction. The section is increasing in importance.

Hydrographical service.—(About to be reorganized, fewer subdivisions. More personnel). This service is under the control of the chief of the general staff and is in charge of a director of hydrography, who belongs to the corps of "Ingenieurs Hydrographes." It consists of seven sections, as follows: First section, general hydrography; second section, French coasts; third section, charts and archives; fourth section, nautical instruction; fifth section, scientific instruments and tides; sixth section, nautical instruments; and seventh section, naval meteorology.

(*f*) *Personnel Branch*

The head of this branch is a rear admiral, directly responsible to the Minister of Marine.

The department is divided into four divisions: First, officer; second, naval justice and prisons; third, enlisted personnel; and fourth, recruiting and reserves.

(*g*) *The Aeronautical Service*

Under a rear admiral directly responsible to the minister and is comprised as follows: First section, aviation, (*a*) personnel, (*b*) material. Second section, aerostation, (*a*) personnel, (*b*) material.

(*h*) *Paymaster Branch* (*Intendance Maritime*)

The head of this branch is a senior officer of the paymaster branch (Commissaire General de 2éme classe) de la Marine). He is directly responsible to the minister.

The department is divided into three branches: First, pay and traveling expenses of the navy; second, subsistence, provisions, and clothing; third, victualing (stores and freight).

(*i*) *Medical Department* (*Direction du Service de Santé*)

This department, under a Médecin Général de 2éme classe, has the administration of the personnel, stores, and credits allotted to the naval medical service. The director is directly responsible to the minister.

(*j*) *Naval Construction Department* (*Direction des Constructions Navales*)

This department is in charge of an Ingénieur Général de 2éme classe du Génie Maritime, who is directly responsible to the minister. He has under him the following sections:

Naval construction section (sous-direction des Constructions Navales).

Technical branch (Service Technique des Construction Navales).

Repairs section (Bureau des Réparations).

Superintendence of contract work (Service de la Serveillance des Travaux confiés a l'Industrie).

(*k*) *Naval Ordnance Department* (*Direction Centrale de l'Artillerie Navale*)

This department, under an ingénieur Général de 2éme classe, is responsible for all matters relating to naval ordnance. The director is directly responsible to the minister.

The department is divided as follows:

First section, administrative and secretariat, workshops and supplies.

Second section, technical service (Service Technique de l'Artillerie Navale).

Third section, inspection of ordnance material (Inspection des Fabrications d'Artillerie Navale).

Fourth section, powder.

(*l*) *The Account General's Department* (*Direction de la Comptabilité Générale*)

The duties of this department are to draw up the budget from the details received from the various departments and to follow the

execution of it, to pay all accounts for the department, to generally centralize and verify all accounts of the different departments, and to pay all pensions and invaliding pay.

The head of this department is a civilian of rank "Directeur" (relative rank rear admiral).

(*m*) *Inspection Department* (*Direction du Controle*)

This department is directly under the minister. Its duties are carried out by a special "Corps de Controle" whose powers are almost unlimited. Its object is to protect the rights of the public, and to see that all moneys voted for the navy are expended in the proper manner. The officers of this corps can go into any naval establishment, office, or ship, on most occasions in plain clothes, and call for all the accounts they require or for information on any point they may think necessary, reporting any irregularities they may find to the director in Paris.

The controllers can examine the books and accounts of everything in connection with the naval service but their duties are very much wider than those of a simple auditor and nothing in connection with the service can be said to be outside their province.

(*n*) *Public Works*

Under the minister de la marine is established a section known as "Travaux Maritime et des batiments Civil de la Marine." Personnel comprising this section are assigned to the navy department by the minister of public works. The section consists of

(*a*) Technical bureau.

(*b*) Administrative bureau.

Waterfront and harbor construction comes under this section.

All architectural construction, buildings, are supervised and attended to by the minister of public instruction and arts acting upon the request of the mininster of marine.

The departments of construction navales, l'artillerie naval and aeronautics are charged with the construction, reparation and upkeep of the works which come within their respective provinces. Personnel for this work are assigned by the minister of public works to the minister of marine which latter details them to the three departments.

THE ADMINISTRATION OF THE NAVAL FORCES

9. The administration of the naval districts, ports, and establishments at home and abroad:

(*a*) Under the chief of the general staff are the two vice admirals commanding the forces of the north and the forces of the Mediter-

ranean. In time of peace these two vice admirals are general inspectors of the forces which they command in time of war, that is (1) naval forces of the high seas, (2) patrol forces, (3) land, sea, and air forces whether fixed or mobile assigned to coast defense.

Their headquarters are in Paris in time of peace.

(*b*) The naval forces of the high seas are commanded by flag officers who function directly under the minister of marine in time of peace, and in time of war under the commander in chief of their respective regions.

(*c*) Patrol forces in each of the following areas are commanded by a flag officer appointed in time of peace: (1) North Sea and English Channel, (2) Atlantic, (3) Mediterranean—(1) and (2) are under the commander in chief of the north and (3) under the commander in chief of the Mediterranean.

(*d*) A vice admiral receives, in times of peace, an annual appointment to exercise, in time of war, the chief command of the coast defense of the second, third, and fourth naval districts. On mobilization he assumes the title "Commander in Chief Atlantic Coast."

In time of peace he is the inspector general of the naval forces definitely assigned to the defense of the three districts, and he bears the title "Inspector General Atlantic Coast."

(*e*) From the military as well as from the administrative point of view, the coast is divided into six naval districts, the limits of which are fixed by decree. A general officer bearing the title of maritime prefect is placed at the head of each district.

In addition to the powers conferred upon him by previous acts in force, the maritime prefect is charged with the coast defense of his district against the enemy afloat, in the act of landing or having landed. For this purpose he has under his authority all the elements definitely assigned to this duty, which may include portions of the Army. He is assisted in all military matters relating to organization and the preparation of the naval elements of defense by a flag or senior officer, who, while exercising in time of peace as well as war, command of the sector of the headquarters port, shall also exercise in time of peace, by delegation of the maritime prefect superior command of the naval forces for the defense of the district.

In time of peace the maritime prefects are directly subordinate to the Minister of Marine. In time of war they are still subordinate to the Minister of Marine for all matters of a technical or administrative character which do not concern military operations; for everything concerning military operations they are directly subordinate to the vice admirals in command of the naval forces of their region, or through the commander in chief of the Atlantic coast, in the case of the maritime prefects of the second, third, and fourth districts.

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In time of peace, maritime prefects of the rank of vice admiral bear the title of commander in chief.

In time of peace, maritime prefects reside at the headquarters of their district. In time of war they may establish their headquarters at one of the places previously provided or made necessary by circumstances.

From the military point of view the coast of each district is divided into sectors which are commanded as a rule by flag or superior officers of the navy.

The commanding officers of sectors are directly subordinate to the maritime prefect.

The boundaries of sectors are fixed by a ministerial order.

The naval bases located within a district are commanded by flag or superior officers of the navy who bear the title of "Naval commandant at —"

These officers as a rule command the sector containing their base.

III. Strength—Personnel—Ships

10. The regular establishment is comprised as follows:

Commissioned officers	3,159
Warrant officers	259
Midshipmen at sea	75
Enlisted personnel	50,487
Total [1]	53,980

NOTE.— In addition to the above, there are 139 midshipmen at the naval academy at Brest.

11. There is no marine corps. All duties performed by our Marines (afloat) are performed by bluejackets in the French Navy and duties performed by our Marines (ashore) are performed by members of the "Gendarmerie Maritime," comprised as follows:

Officers	12
Enlisted men	380
Total	392

12. The French Naval Reserve Force is comprised as follows:

Commissioned officers	2,772
Officers, French Merchant Marine	5,980
Warrant officers	193
Enlisted men, 1st Reserve	78,780
Enlisted men, 2d Reserve	75,200
Total	162,925

[1] Includes 210 officers and 3,500 men for aviation.

13. Number of ships (completed) are shown below, as of October 1, 1925.

Battleships, first line	6
Battleships, second line	3
Cruisers, second line	11
Light cruisers, first line	3
Light cruisers, second line	2
Destroyer leaders	1
Destroyers, first line	19
Destroyers, second line	28
Submarines, first line	15
Submarines, second line	24
Mine-laying submarines, first line	3
Mine-laying submarines, second line	3
Fleet submarines, second line	1
Gunboats and patrol vessels (500 to 3,000 tons)	56
Converted yachts	3
Patrol vessels (100 to 500 tons)	70
Patrol vessels (under 100 tons)	54
Mine sweepers	29
Auxiliaries:	
Colliers	1
Refrigerator and store ships	10
Hospital ships	3
Oil tankers	9
Transports	3
Repair ships	2
Tugs (seagoing, over 500 tons)	29
Surveying ships (auxiliary and miscellaneous)	9
Auxiliaries—Miscellaneous	2

IV. Distribution

14. Organization of French Fleet:

MEDITERRANEAN FLEET—FIRST SQUADRON

Provence.	Paris.
Bretagne.	Courbet.
Lorraine.	Jean Bart.

Third Light Cruiser Division

Metz.	Strasbourg.

First Torpedo Flotilla

Amiral Senes.	Francais Garnier.
Bouclier.	Protet.
Capitaine Mehil.	Comdt. Bory.
Bisson.	

Third Torpedo Division

Mangini.	Cimeterre.
Comdt. Lucas.	Comdt. Riviere.
Matelot le Blanc.	

Fifth Torpedo Division

Annamite.
Bambara.
Hova.
Touareg.
Somali.
Tonkinois.

Submarine Flotilla

Andromaque.
Dupuy-de-Lome.
Astree.
Atlanti.
Curie.
Joessel.
Sane.
Maurice Callot.
O'Byrne.
Romazzatti.
Dupetit-Thouars.
Fulton.
Henri Fournier.
Jean Autric.
Jean Roulier.
La Grange.
Leon Mignot.
Nereide.
Pierre Marrast.

Special Service Division

Jules Ferry.

Submarine Division—Bizerte

Amazone.
Armide.
Scarp.
Antigone.
Artemis.
Arethuse.

Channel and North Sea Fleet

Diderot.
Voltaire.
Condorcet.
Mulhouse.

Second Torpedo Division

Chastang.
Mazare.
Vesco.
Deligny.
Rageot de la Touche.

Sixth Torpedo Division

Buino.
Enseigne Gabolde.
Magon.
Delage.
Enseigne Roux.
Pierre Durand.

Submarine Flotilla

Amphitrite.
Bellone.
Carissan.
Clorinde.
Daphne.
Euler.
Rene Audry.
Roland Morillot.
Victor Reveille.
Jean Carissan.
Gorgone.
Gustave-Zede.
Halbronne.
Hermione.
Jean Corre.
Laplace.
Menton.
Trinite Schillemans.
Newton.

ASIATIC FLEET

Jules Michelet (flagship).
Altair.
Argus.
Doudart-de-Lagree.
La Grandiere.
Moqueuse.
Algol.
Balny.
Craonne.
Inconstant.
Malicieuse.
Pei-Ho.
Marne.

PACIFIC STATION

Aldebaran

INDIAN OCEAN

Bellatrix

LEVANTE STATION

Baccarat.	Bethune.
Dedaigneusl.	Lievin.

V. Aviation

15. The aeronautical activities of France are controlled by four ministries:

(*a*) Army Air Service by the Ministry of War.

(*b*) Naval Air Service by the Naval Ministry.

(*c*) Civil Aviation and consolidated research and supply by the Ministry of Public Works.

(*d*) Colonial Air Service by the Colonial Ministry.

16. The technical research and development and a large portion of the production is consolidated in a so-called service technique which is controlled by the Undersecretary of State for Aeronautics and Aerial Transport. This is a sub-section of public works. Aviation equipment designed and produced by the service technique for the several ministries is paid for by them if satisfactory to the ministry concerned.

There are officers from the navy on duty with the service technique,

17. On October 1, 1925, there were 210 officers (including 7 warrant officers) and 3,500 enlisted men doing naval aviation duty, and on the same date there were 199 seaplanes and 61 land planes in the naval aviation branch. The unit of organization is the squadron which consists of 9 equipped planes in peace time and 12 in war. On December 15, 1925, there were a total of 6 squadrons in commission (exclusive of 4 squadrons of training planes at flying schools). Of the six squadrons, 4 were at the home air stations; Cherbourg, Brest, La Palyvestre, Gwers, and St. Raphael, and the other 2 were at Bizerta, Tunis.

18. All lighter-than-air activities, except ballons, are turned over to the navy, but very little except research work is being done in this branch. The navy has one rigid and three semirigids. France has no aircraft carriers, but one ex-battleship is being converted. Work on this ship is progressing slowly. The naval aviation budget in 1925 was 107,531,800 francs.

VI. Efficiency and Morale

19. The French Navy is not possessed of a relatively high state of efficiency. This may be attributed to lack of interest and support on the part of the Government combined with the fact that France

is not, generally speaking, a seafaring nation. The army, by far the most important arm of defense, has been kept up and the navy neglected.

20. The navy has suffered, because of the many changing governments with almost continuous changes in the Minister de la Marine. This has resulted in lack of continuing policy.

21. There is an annual turnover of approximately 30 per cent of the entire enlisted personnel. On October 1, 1925, of the total 50,487 there were 10,963 conscripts maritime (obligatory service 5 years), 5,926 military conscripts (obligatory service 18 months.) These latter comprise practically the entire artificer personnel of the navy. There is a movement on foot to reduce to 12 months the period of obligatory service for army conscripts, so that it can be seen the artificer situation in the navy is critically dangerous.

22. Great difficulty is being experienced in recruiting. Recently it has been impossible to keep up to the total authorized strength of 55,000.

VII. Merchant Marine

23.

	Number	Tonnage
Number and total gross tonnage	1,527	3,319,645
Number and tonnage less than 12 knots	618	2,788,902
Number and tonnage 12 to 16 knots	123	788,979
Number and tonnage 17 to 20 knots	17	109,214
Number and tonnage 20 knots up	9	108,626

Data for the above are of June 30, 1925.

VIII. French Naval Budgets, 1924 and 1925

24. (*a*) Total French Government budgets:

	Francs
1924	24,249,921,013
1925	33,137,180,618

(*b*) Total naval budgets:

	Francs
1924	1,038,715,430
1925	1,251,973,465

(*c*) Percentage of naval budgets to total:

	Per cent
1924	4.282
1925	3.778

25. Appropriations are made each year to continue new construction, the amounts made available in 1924 and 1925 being 283,232,500 francs and 388,662,325 francs, respectively. The total estimated cost of "vessels building" shown in previous table is 1,484,800,000 francs, and of those "authorized and appropriated for" (1925 program) is 831,600,000 francs.

IX. Conclusion

26. The French Navy has been reorganized along highly efficient lines. The new construction program is extensive and ambitious. The continuance of present effort should result in an efficient navy commensurate with the needs of the French Republic.

The 1,100 tons submarine *Phoque* (*Seal*) was launched at the Government arsenal, Brest, March 17.

GREAT BRITAIN

SUMMARY OF NAVAL PROMOTION AND RETIREMENT LAWS, APRIL 1, 1926

[Source: Latest official British Admiralty publications and from a summary on the subject prepared in O. N. I. in August, 1924]

Naval cadets enter Dartmouth at the age of 13⅓ to 13⅔ years. The period of training at Dartmouth is 3 years and 9 months, after which they are sent to the ships of the fleet for a further training period of 8 months. Special entry cadets enter at the age of 17½ to 18½ years and undergo a period of training of one year. Dartmouth cadets may gain time on the amount of service required for promotion to lieutenant by their standing at Dartmouth to the extent of 2 months, and another month may be gained as a result of their seamanship examination when passing for acting sublieutenant (1 month being allowed for a first-class certificate and ½ month for a second-class certificate). Similarly, the special entry cadet is allowed two months' time toward promotion if he passes the training course with a first-class certificate and one month if he passes with a second-class certificate.

After completing the training course the cadets are rated midshipmen.

Normally, Dartmouth midshipmen serve 2 years and 4 months and special entry midshipmen 1 year and 10 months, when they are examined in seamanship and navigation, and, if successful, they are appointed acting sublieutenants.

Midshipmen who are recommended by their captains as likely to obtain at least a second-class certificate in navigation and seamanship may take those examinations four months prior to the regular date. Midshipmen who fail in seamanship and navigation are put back four months and then reexamined.

Dartmouth entries are confirmed as sublieutenant after having completed from 2 years and 10 months to 3 years and 1 month's service (depending on amount of time gained at Dartmouth and on the seamanship examination). For midshipmen who qualify for acting sublieutenant four months in advance of their term, as before described, period of service is four months less.

Before being confirmed as sublieutenants, acting sublieutenants undergo courses and are examined in seamanship, navigation, gunnery, torpedoes, and the Greenwich course, and the length of time they must serve in the grade of sublieutenant depends on the standing in these courses for each one in which a first-class certificate (a multiple 70 per cent or over) is made 2 marks are awarded; for each one in which a second-class certificate (50 per cent or over), 1 mark is awarded; 30 per cent or over is required to pass. A man obtaining 10 marks is made a lieutenant after 13 months as sublieutenant; a man making 0 marks is made lieutenant after 36 months as sublieutenant.

Promotion to the grade of lieutenant commander is automatic after 8 years' service as lieutenant.

Promotion from lieutenant commander to commander is by selection. The Admiralty notifies the zones of selection. For the promotions made as of January 1, 1926, commanders were drawn from those of $6\frac{1}{4}$ to 3 years seniority in the lieutenant commander grade.

Promotion from commander to captain is by selection. The commanders promoted to captains were drawn from those between 8 to 5½ years seniority as commanders.

Promotion from captain to rear admiral is by selection. To qualify a captain whose seniority brings him in line for selection, he must have served the following periods, of which three years must in each case have been in command of a ship of war at sea:

During peace	6 years
During war	4 years
During peace and war combined	5 years

The first two years of the service necessary to qualify for advancement to flag rank must be in command of a ship of war at sea.

Captains who arrive at their turn for promotion without having completed the qualifying service will be retired.

The promotion of captains when vacancies occur is regulated by seniority to the extent that the captain first in seniority who has served his time is first considered. In the event of a captain whose seniority brings him in turn for advancement preferring to continue as a captain, he may be placed on the retired list.

Promotion from rear admiral to vice admiral is by seniority.

Promotion from vice admiral to admiral is by seniority.

Admirals of the fleet are selected from admirals on the active list who have served with distinction without regard to seniority.

There is a form of retirement for nonservice which amounts in fact to selection out. Officers are placed on the unemployed or half-pay list and if not called back to service at the end of certain periods, these officers are placed on the retired list.

These periods are as follows:

Admiral: Three years since their last service as flag officer, with a minimum of one year on the admiral's list.

Vice admirals: Three years since their last service as flag officer, with a minimum of one year on the vice admiral's list; or on promotion to admiral if they have not served as vice admiral.

Rear admirals: Two and one-half years from date of last service in the rank of rear admiral, or if they have not served in the rank of rear admiral, two and one-half years from date of promotion to that rank, or three years from date of last service in the rank of captain, whichever period expires first.

Captains: Two years from date of last service in the rank of captain, but not less than three years from date of promotion to that rank, or if they have not served in the rank of captain, three years from date of promotion to that rank.

Commanders: Two years from date of last service in the rank of commander, or, if they have not served in the rank of commander, two years from date of promotion to that rank.

Lieutenant commanders and lieutenants: Three years from date of last service in the rank of lieutenant commander or lieutenant, or, if they have not served in the rank of lieutenant, three years from date of promotion to that rank.

NOTE.—Chaplains of the Church of England to be retired after two years from date of last service.

There is also an age for compulsory retirement which is as follows:

Admirals	65	Commanders	50
Vice admirals	65	Lieutenant commanders	45
Rear admirals	60	Lieutenants	45
Captains	55	Sublieutenants	40

GREAT BRITAIN

MISCELLANEOUS NOTES, MARCH, 1926

[From the British press]

Recent Gunnery Practices

The *Tiger*, battle cruiser, gunnery ship, will carry out gunnery practices off Shoeburyness during the second and third weeks in March, when firing will take place with her 6-inch and 13.5-inch guns. The *Tiger* will be attended by the tug *St. Martin* and the drifter *Indian Summer*. The destroyers *Stork* (tender to Chatham Gunnery School) and *Steadfast* will be on duty at the practices.

In connection with the maneuvers of the Mediterranean Fleet off Malta the following is of interest: The whole battle from beginning to end will probably last 90 minutes. The ships will fire 250 torpedoes, 600 rounds of 13.5-inch shell, 400 rounds of 6-inch shell, and

smaller shell ad libitum, so that for the ships engaged, the guns fired, and the ammunition expended in a stated time this will easily be the heaviest and biggest fight in history. No great damage is to be done, because except where targets are provided, all guns will be fired with throw-off sights—i. e., though aimed at ships, the projectiles will drop 200 yards astern. Scouters and bombers will tow sleeve targets, and neutral destroyers towing kites at high speed will provide other aerial targets.

This expenditure of ammunition, far greater than in actual warfare, is actually a measure of economy, for the ammunition of the *Iron Duke* class, that is soon paying off into reserve, is nearly due for destruction, and if not fired this would be taken home and burnt. All of the 250 torpedoes must be found and picked up.

The concussion during the above firing is said to have caused havoc among the frailer parts of some of the ships, and a member of one of the crews was sent to Bighi Hospital when the ships returned to port.

Two new cruisers ordered

The contracts for the two remaining cruisers of the 1925–26 British naval program are now being placed. One of these has been ordered from R. W. Hawthorn, Leslie & Co. (Ltd.), Newcastle-on-Tyne, and the other will go to William Beardmore & Co. (Ltd.), Dalmuir, when certain details have been adjusted. These conclude the program of four cruisers embraced in this year's program and belong to the "County" class. All these vessels come, of course, under the restrictions as to displacement tonnage and caliber of guns laid down by the Washington Conference. They are, therefore, of 10,000 tons displacement, and the limit in the caliber of the guns is 8 inches. The designers, however, are free to adopt any number of guns, always provided that the conference limit of displacement does not exceed 10,000 tons. The speed, of course, must always be an important factor. This involves the question of the weight of machinery. It is just probable that when fuller details are available it will be found that a higher steam pressure than in former ships has been adopted. Already with the destroyers the Admiralty have gone as far as 350 pounds per square inch, and if still higher or similar pressure is adopted in the later cruisers the weight of machinery will be reduced, while, at the same time, the oil-fuel capacity can be made less, leaving a margin as compared with the previous ships, if the radius of action is maintained as with the earlier cruisers. There is reason for such a development in view of Sir Charles Parsons's decision to supply Yarrow boilers and Parsons turbines in a vessel for the Clyde services with a pressure of 550 pounds per square inch. The Admiralty, however, will act prudently in this matter and possibly refrain from going to anything like the same pressure as in this Clyde passenger steamer. They will, no doubt, watch with keen interest the results of the trials and experience in service of this new vessel. These orders placed will give nine new cruisers of the "County" class. The first to be floated, the *Suffolk*, from Portsmouth dockyard, was launched on February 16, 1926. The *Cornwall*

will be sent afloat from the Devonport dockyard in March. The others of the 1924–25 program are the *Berwick*, building at Fairfield, Glasgow; the *Cumberland*, building at Vickers, Barrow-in-Furness; and the *Kent*, being constructed at Chatham dockyard. Two more were ordered from the Portsmouth dockyard and the Devonport dockyard to follow the *Suffolk* and the *Cornwall*. It was hoped to have the keel of these laid in October or November of last year, so that the new ships are late in being laid down. The other two are those ordered this week. In addition, John Brown & Co., of Clydebank, are building two similar cruisers for the Australian Government. Next year it is anticipated that three more British cruisers will be laid down. This will give us in all 12 British and 2 Australian postwar light cruisers.

Names of new light cruisers

The four cruisers of the 1925–26 programme will be named as under:

H. M. S. *Devonshire*, to be built at Devonport dockyard.

H. M. S. *London*, to be built at Portsmouth dockyard.

H. M. S. *Shropshire*, and H. M. S. *Sussex*, to be built by contract.

Contracts for new gunboats

Messrs. Yarrow & Co. (Ltd.), of Scotstoun, have received an order to build the four gunboats provided for in the 1925–26 programme. A sum of £210,652 is provided in the new navy estimates to be spent on them up to March 31, 1927, and they are to be completed in that year.

Launching of the "Cumberland"

The *Cumberland*, one of the five 10,000-ton cruisers voted by the labor government and begun in 1924, was launched at 12.30 p. m., March 16, 1926, at the Vickers Works, Barrow-in-Furness.

Before the launching guests were permitted to inspect the works under the guidance of one of the officials of Vickers. The following information is believed to be reliable:

The *Cumberland* is 620 feet long, and has eight boilers developing a total of 80,000 horsepower. These boilers are of the modified Yarrow type and were said to carry steam pressure of about 250 pounds. The ship is expected to make 30 knots. She has four screws with Parsons geared turbines. She is to have a battery of eight 8-inch guns arranged in four turrets, two forward and two aft. These turrets were observed in the shops and were of light construction with a thickness of about $\frac{7}{8}$ inch. In the shops were also observed about 10 control towers, each equipped with a 15-foot range finder built into the tower. It is understood that Vickers is building these control towers for all five of the cruisers and that each one will have two. It is the opinion that the magazines, boilers, and engines are protected by 3-inch deck armor and 4 inches of side armor inside the explosion chambers.

Three lines were made fast to heavy shackles bolted into the bow. These lines are heavy wire hawsers and are attached on both bows and secured to about 400 tons of chain cable distributed up and down on either side of the launching ways. By means of this heavy drag the ship was brought up in almost her own length after launching, and the wire cables which were attached to the shackles by pelican hooks were promptly slipped by means of lines leading to the decks, as shown. The whole launching was a matter of only a few minutes and showed the high efficiency of this yard.

Cruisers "Concord," "Vindictive," and "Delhi" to be refitted

The *Concord*, cruiser, which has been relieved on the China station by the cruiser *Vindictive*, is returning to Devonport, where she is to commence a refit next month or in May. The cruiser *Delhi*, of the Mediterranean station, now attached temporarily to the Australian fleet, is to go to Devonport to refit in September, and about the same time the cruiser *Durban* is to arrive at Devonport from the China station to undergo refit.

Assignment of construction and repair work

All the work to be done during the year will be divided among the yards as follows:

Portsmouth: Cruisers *Suffold* and *London* and one unnamed (to be begun). Battleships *Valiant* and *Warspite;* battle cruisers *Renown* and *Tiger;* cruiser *Dartmouth*, undergoing reconstruction and refit.

Devonport: Cruisers *Cornwall* and *Devonshire*, building. Aircraft carriers *Courageous* and *Glorious;* battleships *Ramillies;* cruiser *Carysfort;* sloop *Rosemary*, undergoing reconstruction and refit.

Chatham: Cruiser *Kent;* submarines *X 1* and *O 1*, and one unnamed; large floating dock, building. Battleship *Ajax;* aircraft carrier *Argus;* repair ship *Assistance;* depot ship *Lucia;* cruisers *Caledon, Constance, Cleopatra, Calliope*, undergoing reconstruction and refit.

Sheerness: Sloops *Dahlia* and *Verbena;* tug Volatile, undergoing refit.

Replacing of H. M. S. Thunderer by H. M. S. Erebus as training ship for special entry cadets at Devonport

The replacing of the battleship *Thunderer* by the monitor *Erebus* as training ship for special entry cadets at Devonport is one of those economies by which the Admiralty hope to pay for the construction and effect certain other savings for the benefit of the taxpayer. Presumably the *Erebus* will not only be used for the accommodation of cadets and take the place of the *Marshal Soult* as turret drill ship, but will also become the ship of the Senior Officer Reserve Fleet at Devonport, so that the net effect of the changes will be a reduction of the vessels belonging to the port by one battleship.

The saving, although not so great as might appear on the surface, will be considerable, and the reduction is only one of rather a large number that have been effected in the port since the war ended. The process of attrition has

been so gradual that its extent has probably escaped the attention of most people, but its effect must be felt in some quarters. The most serious change was the closing down of the Indus and the transfer of artificer apprentices to the Fishgard at Portsmouth. Quite recently the *Woolwich*, which had been so long used as depot ship of the Deserve Destroyer Flotilla, was abolished, and the number of tenders to local establishments was reduced, while on the 1st instant the R. N. Detention Quarters at Bull Point were closed.

New floating dock for New South Wales

The subcommittee of the New South Wales cabinet has decided to recommend the building of a 15,000-ton floating dock at Walsh Island dockyard, Newcastle, costing approximately £435,000. This will entitle the New South Wales Government to a Commonwealth subsidy of £135,000, on condition that the dock is handed over to the commonwealth government in time of war or other emergency.

Qualifications to command destroyers

The Admiralty have recently promulgated a number of amendments to King's Regulations and Admiralty Instructions, among them being the following:

No officer will be appointed for the command of a destroyer until he has passed practical examinations in navigation and pilotage, in gunnery and torpedo, and in signals, as set forth in Appendix X, Part IV. Officers selected for command of destroyers will be required to undergo a two weeks' gyro compass course at the compass department, Slough, before taking up their appointments.

Naval recruits discharged as unfit

The following data of the percentage of new recruits for the navy who were discharged on account of some physical or medical disability in 1925 within 12 months of their acceptance, and the corresponding figures for 1910, 1911, 1912, and 1913 was recently made public:

Year	Entered	Discharged	Percentage
1925	7,071	189	2.67
1910	13,110	286	2.18
1911	13,138	358	2.73
1912	17,965	445	2.48
1913	16,673	419	2.51

Reintroduction of short service for seamen in the Royal Navy

The Admiralty have decided to reintroduce short service for seamen in the Royal Navy, and recruiting is to commence on April 1, 1926.

The periods of service in the active fleet and in reserve are different from what they were when short service was previously in force. The period for service in the fleet will now be seven years and in the reserve five years, whereas previously the periods were five and seven years, respectively.

Waterproofs to become compulsory kit

The Admiralty announce that from July 1 next the waterproof coat is to be compulsory kit for all ratings. The overcoat will remain "optional," but will be included in the free kit given to new entries, as hitherto.

The regulation type of waterproof coat for chief petty officers and other men not dressed as seamen will be the blue mackintosh. The regulation type for men dressed as seamen will be the "oilskin."

Suitable stowage is to be provided in H. M. ships and fleet establishments for the men's personal waterproofs to enable the coats to be hung up. In existing ships, where this is not already done, stowage arrangements, as far as available, are to be made by ship's officers in conjunction with the yard officers, and the work carried out as far as possible by ship's staff with yard assistance. Accommodation should also be provided, within the space and facilities available, for personal overcoats; but as, generally speaking, suitable accommodation can not be found for overcoats as well as waterproof coats for all ratings, men drafted afloat or to a station where the article is not required may, if they wish, dispose of their overcoats to other ratings at a price to be approved by the purchaser's divisional officer.

Visit to Fairey Aviation Co.

[Source reliable]

A visit was recently made to the works of the Fairey Aviation Co., Hayes, Middlesex. An inspection of the shop was made in a general way, and it was found that the force is approximately the same as last summer.

They are still experimenting with the Fairey propellers, especially a type of propeller for the Fairey "Fox." It was stated that there was material for approximately 12 new propellers, and that as soon as the experimental work was accomplished, a regular propeller shop would be set up.

Six Fairey "Fox's" were seen in various stages of construction, one, equipped with a Curtis D12 engine, being almost completed. It was stated that the engine in this plane was one of the old engines, but the first engine of the 30 ordered from America had arrived, and that in approximately two months or less the British would have a complete squadron of the Fairey "Fox" two-seater fighters. On account of the speed and climb of the Fairey, it was stated that the British have an idea of making this plane into a fast day bomber and it would appear that this may be what they may use her for in addition to a two-seater fighter. The management was quite put out that on the test of the Curtis engine at Farnborough, under the supervision of the Air Ministery, it had failed at the end of 92½ hours, due to the fact that a nut had dropped out and got in the gears of the oil pump. It will be necessary to run another 100 hours to complete the test properly.

There were seen in various stages of construction 6 Fairey "Fawns," equipped with Napier engines with superchargers. In another part of the shop 6 Fairey IIID's were observed in various stages of construction. Twelve pontoons for the Fairey IIID airplane were also seen in various stages of completion. Twelve pontoons of the design used on the "Flycatcher" were practically completed.

Two duralumin floats were noted in the process of building and were considered to be about 70 per cent completed. It was stated that they are still experimenting with the duralumin wooden floats, but that not much was thought of them, and that wooden floats were preferable. It was stated that they could make wooden floats as good as the duralumin and at about one-seventh to one-tenth of the cost of the duralumin float.

From the work going on it appeared that the whole force were engaged in completing all unfinished work before the end of March, the end of the British Government's fiscal year.

It was noted also that a great many tail skids for the "Flycatcher" airplane were in process of completion. Fourteen of these tail skids were counted and there were quite a few more under construction. They were of the type used for landing aboard ship. They were especially heavily built, the end being protected by steel.

Proposed creation of an Indian navy

[From a consular report]

The Viceroy of India, addressing the Council of State at Delhi on February 11, in referring to the subject remarked:

Subject to the necessary legislation being effected, it has been decided to reconstruct the Royal Indian Marine as a combatant force to enable India to enter upon the first stage of her naval development, and ultimately to undertake her own naval defense.

Subject to the approval of His Majesty the King-Emperor, the service will be known as the Royal Indian Navy and will fly the white ensign. Its functions in peace will be as defined in paragraph 3 of the report of Lord Rawalinson's committee. Its most important aspect in the early stages will be that of a training squadron. It will train the personnel for service in war. For this purpose it will become from the first a seagoing force in addition.

In peace time its functions will include the services required by the government of India in the Indian Ocean and in the Persian Gulf, the organization of the naval defense at ports, marine survey in the India Ocean, and marine transport work for the government of India.

FIRST STAGE

The fleet will consist in its first stage of development of the vessels enumerated in paragraph 4 of the report.

The inauguration of the Royal Indian Navy will be instrusted to the personnel of the existing service, subject to any necessary readjustment of cadres, and Indian gentlemen will be eligible to hold commissioned rank in that service.

The changes which this policy involves will be carried out as soon as an agreement has been reached in consultation with the Admiralty, and with other authorities whose expert advice and assistance will be necessary on detailed questions of administration, organization, and finance.

I need not emphasize to the honorable members of this chamber the significance of the decision. It embodies an important principle. Thinking men in India have long desired the creation of an Indian navy for India capable of defending her coast, her harbors, and her commerce; that laudable ambition will now have its scope.

TWO FEATURES

Let me dwell for a moment upon two features in the announcement. To the imagination of those who understand the traditions of the British Empire, the privilege granted to the Indian navy of the future to fly the white ensign should appeal with special significance. India by this privilege is directly admitted at the outset of her naval career to share in the record of the centuries of proud and gallant traditions for which that ensign stands.

It is a high privilege. It carries with it the great responsibility of rendering service worthy of the honors conferred. Even to embark on the first stage of the performance of those duties which the greatest navy in the world has been performing is no light task. Nevertheless, I feel sure that it will be courageously undertaken as a vital part of India's natural ambitions and hopes. To Indians a new and honorable career of national service has been opened.

The recommendation of Lord Rawlinson's committee has been accepted that Indians desiring to qualify for commissions in the Indian navy should receive special facilities for suitable education in earlier years and later for technical training in the naval profession. I look to those who elect to set out on this career to use every effort to foster an esprit de corps, and this great opportunity will be welcomed and turned to the best account for the lasting benefit of India.

This move of the British Government to take a step toward the ultimate organization of an Indian navy appeals to Indian sentiment and will appease for the present those Indians who have been clamoring for Indianization of the services in this country until they realize that years must pass before they can hope to see a navy commanded entirely by Indian officers, and that even a training squadron, which is all that this navy can be, must be a costly matter. As one newspaper observes: "India may be content to pay the price, as Australia has done, but we can see no future in which she will be able to create for herself a navy that is other than a part of the general scheme of empire defense."

Although India is a country comprising many martial races and castes with splendid military records, the Indianization of the army is still progressing very slowly. This being so in regard to the army, it can not be expected that even the same slow progress can be made in the Indianization of a navy when Indians have so little sea sense and experience. There are only a few thousand fishermen and lascars in India out of a population of 319,000,000. India has no shipbuilding industry of her own, and she has no mercantile

marine. A certain number of candidates for the lower ratings are available for the new navy, but probably not one single officer.

The London "Morning Post," in an editorial headed "A Sop to Cerberus," declares:

It is foolish to expect India ever to be able to take over her naval defense from the Royal Navy.

Indians are not sailors and lascars are not fighters. The most sensible Indians will agree that it is a foolish experiment which will waste some small part of their revenues. It will also doubtless strengthen political agitation against the payment of the present small subsidy of £100,000 toward the upkeep of the East Indies squadron.

ITALY

AVIATION NOTES

[From the Italian press]

Flying pay established

Royal Decree No. 206, dated February 10, 1926, has increased the "military extra pay" for officers of the army, navy, and air force by approximately 50 per cent.

1. Military extra pay for officers is hereby established as follows:

	Lire per annum
Midshipman	2,400
Lieutenant (junior grade)	2,600
Lieutenant	3,700
Lieutenant commander	4,700
Commander	5,200
Captain	5,700
Rear admiral	6,200
Rear admiral of division	6,700
Vice admiral of squadron	7,200
Vice admiral of the fleet	9,000
Admiral	12,000
Marshal of Italy	20,000

Married officers will receive 2,100 lire per annum in addition to their military extra pay as above.

2. The military extra pay of petty officers is also correspondingly increased by 50 per cent. Married petty officers will receive in addition, from 1,700 to 2,800 lire per annum, according to their expenses for lodgings.

3. The military extra pay of officers provided with free lodgings is reduced in the following measure:

	Lire per annum
Midshipman	580
Lieutenant (junior grade)	620
Lieutenant	890
Lieutenant commander	1,120
Commander	1,250
Captain	1,330

Rear admiral	1,470
Rear admiral of division	1,560
Vice admiral of squadron	1,700
Vice admiral of the fleet and senior grades	2,150

4. Officers of the naval reserve ("in auxiliary position") will receive the following allowances:

(1) A provisional allowance for pension in accordance with existing regulations.

(2) An annual extra pay as per following table:

	Lire
Lieutenant (junior grade)	1,000
Lieutenant	1,500
Lieutenant commander	2,000
Commander	2,000
Captain	4,000
Rear admiral	4,500
Rear admiral of division	5,000
Vice admiral of squadron	6,000
Vice admiral of the fleet	8,000

New aeronautical academy under construction

An aeronautical academy is being erected in the vicinity of Naples, at Capodichino. Work is well under way and it is expected that the new academy will be inaugurated within three years.

In view of the fact that the buildings of the naval academy at Leghorn are insufficient to meet the requirements of convenient accommodation for the pupils of the aeronautical academy, the Air Ministry has decided that, while the new building at Naples is being completed, the academy will be moved from Leghorn to King's palace at Caserta, 30 kilometers from Naples.

The King's palace at Caserta is particularly spacious and answers all requirements. It is now a national monument and was erected during the Bourbon reign according to designs by Vanvitelli. The aeronautical academy will be transferred to this building in October, 1926. An aviation field will be organized at Gioia del Colle, for summer training of the students. Training will be carried out at the aviation fields of Capua and Capodichino, near Naples, for land planes, and at Naples for sea planes.

Procurement of young pilots

In accordance with Royal Decree Number 141, dated January 14, 1926, the Air Ministry is organizing piloting courses for young men 18 and 19 years of age—that is, boys whose classes have not yet been called to the colors. The course will last one year, during which period of time the pupils will receive board and lodgings, besides a monthly allowance of 150 lire if aspiring to promotion to second lieutenant, and of 100 lire if aspiring to the rank of sargeant.

In case of accident during flying training, an indemnity of 45,000 lire in case of death and 55,000 lire in case of total disability will be paid by the Air Ministry.

After successfully obtaining airplane pilot's brevets, pupils 20 years of age will serve their normal term; those 19 years of age may go home and wait one year before being called with their class, in which case they have to take one refresher course, or else may enlist right away and serve their normal term. On completion of their 18-months compulsory service, second lieutenants and sergeants will receive a bonus of 4,000 and 3,000 lire, respectively. This bonus will be doubled if they reenlist for another 18 months and will again be increased to 10,000 and 7,000 lire, respectively, if second lieutenants remain in service for another 12 months, and if sergeants, enlisting again for another year, complete four full years of service.

Cost of training civilian air pilots

The cost of elementary training of pilots (H. T. A.) at civilian flying schools is as follows:

The Italian Government pays to the civilian pilots' schools for each man fully trained (50 hours instruction) who successfully passes final tests a sum of 50,000 lire for land-plane pilots and 60,000 lire for sea-plane pilots. Board, lodging, and clothing are not included: Student pilots are generally quartered at military barracks and eat at noncommissioned officers' mess. In case of student pilots taking the course, but not completing it or unable to pass successfully final tests, the Government pays to the company, up to 4 per cent of the total number of students in the classes, 1,000 lire for every hour of flying instruction administered. For those over 4 per cent no retribution whatever is allowed.

The Italian Government pays to private schools entrusted with refresher courses for reserve pilots, for each complete course (10 hours flight) a sum of 9,000 lire for land-plane pilots and 11,000 lire for sea-plane pilots. Reserve pilots have to take this course once a year. For those not completing the refresher course, no retribution is granted to the company. In case of interruption of the course due to accident to the reserve pilot, the company gets 1,000 lire for every hour of flying already made by the pilot.

Proposed aeronautical high command

The Italian Press reports that Premier Mussolini, Italian Air Minister, will submit in the near future to the Chamber of Deputies a project for the institution of the "Aeronautical High Com-

mand." According to this project, the post of chief of general staff for aviation may be held only by a general of air fleet. (Present chief of staff holds grade of air division general, he should consequently be promoted.) The chief of general staff would be directly under the Prime Minister.

The chief of general staff will be entrusted with all problems concerning organization; with war preparation; with employment of air fleet, in accordance with the general lines laid down by the chief of central general staff for cooperation of air fleet with the army and navy. The aeronautical academy and the schools will also come under the chief of staff (aviation) for all problems concerning syllabus of studies, general trend of instruction, coordination of courses, etc.

Furthermore, the chief of staff will have a consultive vote within the supreme mixed commission of defense and all other permanent and temporary commissions, whenever the air fleet is concerned. The chief of staff will be assisted in his work by an assistant chief of staff and by a number of general staff officers.

Premier Mussolini will also submit a project for the institution of a technical committee, presided over by the general director of Aeronautical Engineering Corps, and including a number of officers of the aeronautical arm and of the Air Engineering Corps. The technical committee may also include general and senior officers of the army, navy, and air service (nonflying officers), and members of other State administrations as well as civilians, provided they have special knowledge and experience in the problems under discussion. These members will be appointed for each particular case.

Preparation of "N–1" for polar expedition

The preparation of the semi-rigid dirigible, *N–1*, for the Amundsen–Nobile polar expedition is now practically completed, and trial flights and practice mooring at the mooring mast have been conducted at the Ciampino airdrome during the last few days.

During a visit to Ciampino recently it was noted that this dirigible has been considerably lightened. This has been accomplished by reducing the size of the control car and removing all equipment not required on this expedition. It was stated by Colonel Nobile, who is to command this ship during the polar expedition, that a reduction of approximately 1,500 kilos (3,300 pounds) in weight has been effected. He stated that no reduction had been effected in the strength members or control surfaces. It was noted that no attempt has been made to provide protection of crew from wind. The covering of the control car has not been fitted to be windproof

and no provision has been made to reduce the free circulation of air along the keel space.

The nose of the *N–1* has been modified to provide for mooring to a mast. The framing at the nose has been strengthened by some bracing, and a mooring cone installed. The mooring cone appears to be the same as in the Scott type.

These mooring masts have been built for the polar expedition. One of these is at Ciampino, one at Spitzbergen and one in Norway. Engineer Nobile designed the masts, and they were constructed at the L–F–A construction plant in Rome. The mast is quite similar to the Scott mast, but lighter and somewhat simplified by the omission of springs or other flexible fitting at the top. Colonel Nobile estimates that the *N–1* will ride safely at the masts in winds up to about 30 miles per hour.

The plan is to start from Rome in the first days of April to Spitzbergen, stopping in England, Russia (Leningrad), and Norway, en route. Colonel Nobile will be in command and will have a select crew of Italian motorists, etc. It is understood that 3 Norwegian naval officers will be the navigtors and assistant pilots. These officers are not trained airship pilots, but Colonel Nobile will endeavor to train them as much as he can in the limited time available. It is understood that a total of 16 or 17 persons will be on board the ship during the polar expedition, including Amundsen, and Elsworth as passengers.

Since December 19, 1925, the radio transmitting stations of San Paolo and Centocelle and the radio receiving stations of Monterotondo and Torre Chiaruccia are combined under the name of "Rome Radio Centre." This center is under the authority of the director general of arms and naval armaments, and is the central radio station or the Royal navy.

NOTE.—The director general of arms and naval armaments is a sort of chief of staff for material. This office is at present held by Rear Admiral of Division Antonio Foschini.

JAPAN

DEFENSE OF COAST AND HARBORS

The responsibility for defense of coasts and harbors is divided between the Japanese Army and Navy as follows:

(*a*) Navy as the first line of defense as represented by the combined fleet is expected to locate and defeat the approaching enemy on the high seas, provided the home forces are sufficiently strong. If the navy is not sufficiently strong to accomplish the above it has the responsibility of locating, tracking, and determination of the

objective and strength of the enemy, and communicating complete information to headquarters. In case a sortie or landing on the coast is threatened the navy is expected to communicate the necessary information sufficiently in advance to enable the mobile army to concentrate for the defense, and the immobile army as represented by the fortification forces to resist the threatened attack. The Japanese Empire is divided into three naval districts. To each naval district are assigned various naval vessels and aircraft not in the combined fleet which are under the command of the commander in chief of the naval district. The commander in chief of the naval district using the ships and aircraft under his command is responsible, in the waters of his district, for coast patrol: defense of harbors and entrances, using mines, submarines and aircraft: and communications covering the water area. Furthermore the commander in chief of each naval district has authority over the army commander of the fortifications covering the near-by entrances to and waters of the principal naval port of the naval district. As regards the minor naval ports the responsibility is reversed. The army fortifications commander in such localities has the responsibility of the local defense and is assisted in the defense by such naval district sea and air craft as are assigned that minor naval port. In the case of nonnaval harbors and entrances not already specified the army fortifications commander has the responsibility for protection of the harbor and entrances.

(*b*) The duties of the army as the second line of defense consist of:

(1) Defense of ports, harbors, and entrances, using fortifications as specified above.

(2) Use of mobile army to repulse a landing force at any port threatened.

(3) Communications on land.

The distribution of responsibilities for coast and harbor defense among army, navy, and air forces: The naval air force, except for such aircraft as are attached to the two naval air carriers, is all shore, based at naval air stations. All these air stations are under the command of the commander in chief of the naval district in which they are located. The aircraft attached to these air stations form a part of the defensive forces of the district which are used for the defense of coasts and harbors in the district. To the district naval air forces are assigned the duties of patrolling the coasts and other defensive operations. Their area of operations covers a zone extending to seaward from the coast line. The area of operations of the army air force extends from the seacoast inland. The army air force normally has no responsibilities connected with the defense

of coasts and harbors. In case of an enemy air raid in force which would be likely to break through the seacoast zone of the navy air force and penetrate inland the army air forces would then take up the defense. In case of any enemy attempting landing operations in force the army air force would act in conjunction with the mobile army forces to repulse the invasion. The army air force normally operates under army command and never under navy command. The responsibilities of the army and navy have been previously described.

Eventually it is probable that naval air stations will be established at all naval ports, both major and minor, in order that the protection of the coast and harbors may be better covered. No change is contemplated in the present distribution of responsibilities among the army, navy, and air forces for defense of coasts and harbors. The present distribution of responsibilities appears stabilized and final for some years to come, and will result in the steady expansion of the naval air force for coast and harbor defense.

There is no agitation favoring change in the present distribution of responsibilities among the army, navy, and air forces. The tendency in the army is to favor a unified air service, but this is strongly opposed by the navy. There is practically no agitation for a change in the present system. The army air service is recognized as being too small and undeveloped at present to increase its responsibilities and no change is likely for 10 years.

JAPAN

NAVAL GUNNERY AND TORPEDO SCHOOL

Location.—Near Yokosuka.

Purpose.—Practical and theoretical training in gunnery.

Buildings.—All of wood construction.

Personnel.—One rear admiral, 1 captain (chief of staff), 35 instructors of the rank of commander and lieutenant commander, 6 other officers, 8 civilian instructors, 27 warrant officer instructors, 133 petty officer instructors, 18 warrant officers and petty officers attached, 333 sailors, and 32 civilian workmen.

Instruction courses.—(*a*) Voluntary special course for senior and junior officers; duration one year. Object of this course is to permit officers to specialize in some particular form of gunnery. Under instruction, 2 commanders.

(*b*) Ordered: Special course for senior and junior officers (post graduate) in general gunnery subjects. Duration of course, 1 year. Under instruction, 2 lieutenant commanders.

(*c*) Course for gunnery officers: This is a special course for those officers who are to be assigned on board ship. Duration of course, 1 year. Under instruction, 23 lieutenants.

(*d*) Obligatory course for junior officers: Course embracing both theory and practice. Period, 4 to 6 months. Under instruction, 74 lieutenants (junior grade).

(*e*) Special elementary and practical gunnery course for reserve officers. Students for this course consist of reserve officers, including merchant marine officers. Period, 4 to 6 months. Under instruction, 168 reserve officers.

Sailors.—(*a*) Petty officers and men. Period, 10 months. Object of this course is theoretical and practical instruction in the handling of medium-caliber and turret guns. At the end of 7 months a certain number of pupils are selected for a final 3 months' course in handling turret guns. At the end of 10 months all graduates are rated gunnery petty officers first class, and are assigned on board ship for duty with medium-caliber or turret gun divisions.

(*b*) This course is from 6 to 7 months duration and is intended to give practical and theoretical instruction in the service of medium and lower caliber guns. At the termination of the course the graduates are rated gunnery petty officers second class.

(*c*) Range-finding course lasting 8 months. General instruction is given in range finders and practical electricity. Total number of sailors under instruction courses (*a*), (*b*), and (*c*), 851.

Warrant officers special course in fire control: The object of this course is to give thorough instruction in the use of director fire control apparatus for vessels of the first class. Period, 8 months.

NOTE.—Some officers are further sent to war college and universities for special courses in mathematics, etc.

After graduates of course (*b*) sailors have served on board ship for some time some are selected for further instruction in class (*a*) sailors. Net result of gunnery school is that all except minor gun stations of turret guns and all major stations of secondary battery guns are manned by graduates of the various courses of the gunnery school.

Tenders.—Kongo regularly assigned and certain first and second class destroyers attached to Yokosuka are temporarily assigned when needed.

Studies.—The school studies in general embrace instruction in:

(*a*) Target practice, ballistics.

(*b*) Gunnery—guns and mounts; powder and explosives.

(c) Range finders, fire-control instruments, spotting instruments, sights, searchlights.

(*d*) Naval tactics.

(*e*) Military tactics, landing artillery.

(*f*) Mechanics, engine and mortors, electrical and hydraulic machinery, workshop practice.

(*g*) Mathematics, chemical and physical.

(*h*) Special studies in gunnery and laboratory experiments.

Equipment.—Training battery: 20 15-centimeter 45-caliber guns; 12 14-centimeter 50-caliber gun; 6 3-inch, 40-caliber guns, antiair; 2 3-inch, 25-caliber guns, antiair (submarine type); 4 12-inch, mounted in two gun turrets; 6 loading guns, including antiair types.

Turrets.—Turrets with handling rooms complete are mounted on concrete foundations, but are of old type dating from about 1911.

Plug, ammunition hoist, and rammer are operated by hydraulic power by levers located together at side of turret opposite breech, and all capable of being operated by one man.

Guns can be loaded at any angle up to 14°.

Provisions is made for cooling plug using nozzle water spray.

Firing is by hand trigger by each pointer and by the trainer.

No gear in turret for director fire control.

No bulkhead between gun chambers.

Range dials graduated in meters up to 20,000 meters.

Deflector scale graduated to 1,000.

Powder passed up by hand.

Gun trunnions are hollow.

No turret officers' booth.

Turrets capable of providing training in everything but actual firing.

At time of visit no telescopic sights in place.

Secondary-battery guns.—Secondary battery guns except antiair types were mounted in two wooden buildings facing the water front. One of these buildings is still in course of construction but is nearly completed.

Four of the 3-inch 40-caliber antiaircraft guns are mounted on concrete foundations and capable of being used as an antiaircraft battery during war time.

Buildings.—All of wood construction. One two-story building for officers quarters. Three two-story buildings for sailors quarters.

One two-story building, reserve officers quarters.

Two two-story buildings for class instructors.

One two-story administration building.

Various other necessary buildings such as storerooms, lavatories, washrooms, etc.

Rifle range.—A 200-yard rifle range with about 12 butts.

Range-finder range.—Landmarks are provided at various ranges for calibrating range finders and drilling students.

Recreation and drill field.—A field about half a mile long by a quarter of a mile wide is used for drilling and sport purposes. Due to the surrounding hills it is not believed that this field could be used as an airplane landing field.

Spotting room.—In one of the classroom buildings a large room about 100 by 40 feet is provided for spotting, fire-control and tactical instruction.

Two electrically controlled spotting machines each having 24 splashes are provided at one end of room. At the other end is a spotters' booth with spotting glass.

Complete set of ship silhouettes are provided to be used with the splashes.

On two boards each about 4 by 3 feet are painted ocean scenes looking vertically downward and showing on each two ships on different courses.

An arc drawn between the courses of the ships indicated the target angle.

These boards are apparently used for instruction in aircraft spotting, estimating course from aircraft, etc.

COMMENTS AND STATEMENTS

The gunnery school students are sent on board the *Kongo* for instruction in up-to-date turret installation and to man the turrets and secondary-battery guns during actual firing practices.

In connection with the gunnery school, the students, both officers and sailors, apparently receive thorough instruction in both practical and theoretical gunnery.

It s ems logical also that advanced aircraft-spotting instruction is obtained by use of aircraft stationed at Oppama Naval Air Station.

Also it is of interest that merchant marine officers, who are in the naval reserve, are given sufficient training in gunnery that they should be capable of handling the gun crews on board merchant marine vessels during war time, and thus make unnecessary the assignment of regular officers for such duty.

The Japanese Navy method of gunnery instruction appears to have the following advantages:

(1) Economy, in that practical instruction in gunnery, including target practice, is given a large percentage of the navy personnel, using one capital ship only.

(2) Centralization of instruction: Assuming that the instructors are selected for their knowledge of gunnery and ordnance, it would seem that this method should insure more thorough and uniform instruction of personnel than could be accomplished by similar

training carried out on all ships of the navy with ships division officers as instructors.

Statements were made at the gunnery school that aircraft spotting was still experimental and not in practical use.

JAPAN

NAVAL NOTES

Characteristics of "Akagi"

The following characteristics of the aircraft carrier *Akagi* are believed to be authentic:

Length	763 feet.
Beam	92 feet.
Draft	21 feet 2 inches.
Displacement	26,900 tons.
Speed	28.5 knots.

Guns:

Ten 20-centimeter.
Four 12-centimeter.
Twelve 12-centimeter antiaircraft.
Two machine guns.

Characteristics of cruisers

The following details confirm previous information:

7,100-ton cruisers

Length	580 feet.
Beam	50.9 feet.
Draft	14.9 feet.
Speed	33 knots.
Tubes	12 21-inches.
Boilers	12 express type oil burning—two of the 12 boilers are also equipped for coal burning.
Shaft horsepower	100,000
Height foremast	120 feet above water line.

The following information is believed to be correct:

10,000-ton cruisers

Eight 8-inch guns in four double turrets.
Two 4.7-inch antiaircraft guns.
Twelve 21-inch torpedo tubes.

[From the Japanese press]

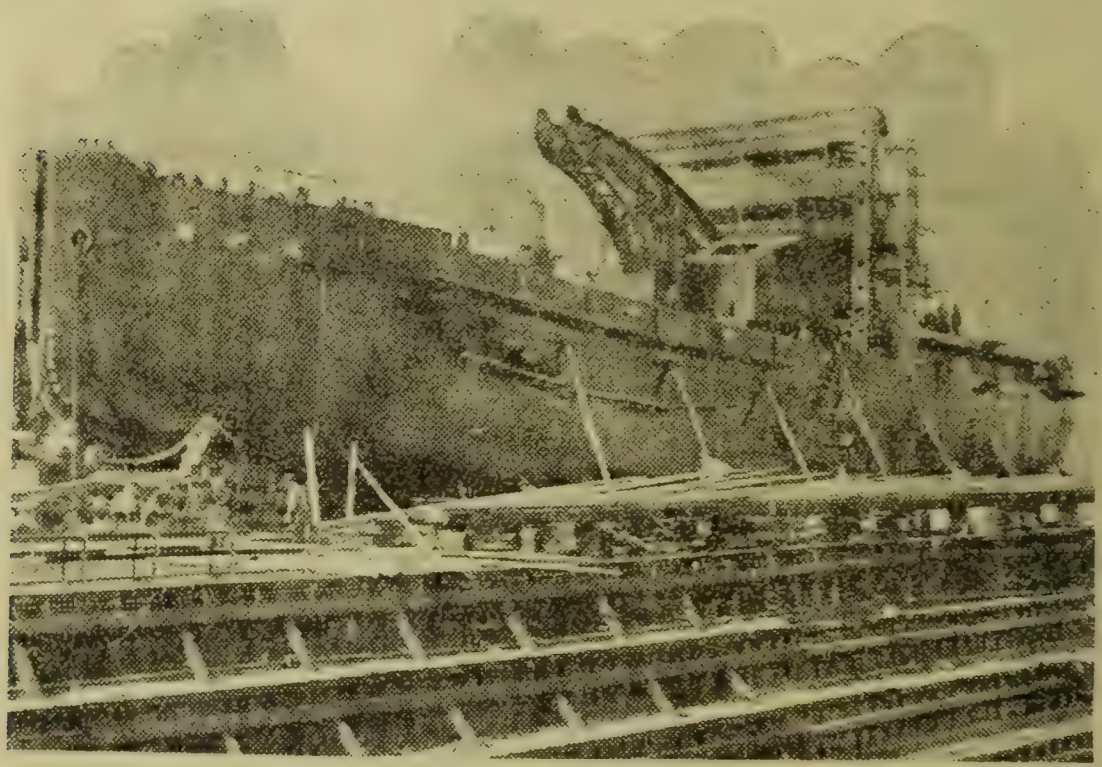
Destroyers damaged

During torpedo practice off Yamaguchi-ken, near Shimonoseki on March 4, one of the torpedoes discharged suddenly changed its course and ran into the propellers of destroyer *No. 3*. The screws of the destroyer were damaged and the destroyer was towed to Kure for repairs.

Destroyer *No. 6*, while coming to anchor after having completed night-firing practice off Yu-u on the night of February 5, a steamer collided with the stern of the destroyer, causing some damage. The destroyer returned to Kure for repairs.

Recent launchings

The *Seishu Maru* was launched at the Ishikawajima Dockyards on February 13, 1926.



SEISHU MARU

This ship was designed by the Japanese Navy Department for the Japanese army ordnance factory and is to be used for the transportation and landing of heavy articles.

NOTE.—The possibility that this vessel is intended for the transportation of heavy artillery in cases of emergency to outlying possessions such as the Bonin Islands is apparent from the illustration.

Destroyer *No. 29* (1,445 tons) was launched at the Fujinagata Yard, Osaka, on February 16, 1926.

Three ships placed in fourth reserve

In connection with information given on page 39, March, 1926, BULLETIN, more recent information has been received to the effect that only the tankers *Ondo*, *Noma*, and *Tsurugizaki* were placed in fourth reserve on February 15, 1926, at the Kure Naval Station.

Torpedo boats sold

Torpedo boats *Hibari* and *Sagi* (152 tons) decommissioned in April, 1923, were sold by tender at the Sasebo Naval Station on March 2, 1926, to R. Nakai, of Osaka, for ¥22,000.

Submarines

Submarines *Ro–57* and *Ro–58* while engaged in training off Mitajiri developed trouble with their rudders, returned to Kure, and were docked on February 13 for the purpose of undergoing repairs.

"Submarines *I–1* and *I–2* (1,970 tons) undergoing equipment at Kobe are expected to be completed during this fiscal year (ending March 31, 1926). Upon completion they will be organized as the seventh submarine division and will belong to the second submarine squadron."

Submarines *I–51* and *I–52* which have been undergoing partial reconstruction at Kure have been completed and will leave Kure to join the fleet.

Itinerary of Japanese training squadron

The following is the itinerary of the training squadron (*Yakumo* and *Idzumo*). Vice Admiral Y. Yamamoto will be in command:

	Arrive	Leave		Arrive	Leave
	1926	1926		1926	1926
Yokosuka	.....	June 30	Marseilles	Oct. 11	Oct. 21
Shanghai	July 5	July 9	Barcelona	Oct. 22	Oct. 27
Hongkong	July 13	July 17	Malta	Oct. 30	Nov. 2
Singapore	July 24	July 28	Alexandria	Nov. 6	Nov. 9
Colombo	Aug. 6	Aug. 10	Jibuti	Nov. 17	Nov. 19
Aden	Aug. 23	Aug. 25	Mombassa	Nov. 28	Dec. 1
Port Said	Sept. 1	Sept. 5	Colombo	Dec. 12	Dec. 14
Constantinople	Sept. 9	Sept. 15	Batavia	Dec. 23	Dec. 27
Athens	Sept. 17	Sept. 21			
Napoli	Sept. 24	Oct. 2		1927	1927
Spezia	Oct. 4	Oct. 7	Manila	Jan. 3	Jan. 7
Toulon	Oct. 8	Oct. 11	Yokosuka	Jan. 15	.....

Navy to build arsenal at Maidzuru

The navy department has decided to build an arsenal for the sole manufacture of explosives in the district of Nagahama, Maidzuru. The site will cover about 50,000 tsubo and the workers of the arsenal will number 300.

Mitsubishi Dockyard Co. to build motor boats

The Mitsubishi Dockyard Co., Nagasaki, recently purchased from the Thornycroft Works, England, their rights to build high-speed motor boats. These boats have a speed of 35 knots, but the Dockyard Co. by some improvement to the engine will give the boats a speed of 40 knots.

JAPAN

AVIATION NOTES

[From the Japanese press]

Navy to hold night aerial maneuvers

The Yokosuka Aviation Corps will hold an aerial maneuver on March 5th, midnight.

It will be assumed that a large number of enemy planes and dirigibles are coming from the direction of Miura Peninsula with the object of destroying Yokosuka Naval Station.

On the night of the maneuver all ships in the harbor will be ordered to extinguish their lights, all lights on the entire peninsula will also be extinguished. The gendarmes will be held in readiness for the maintenance of peace and order. Preparations will be made to ward off the enemy, antiaircraft guns, both on land and water, will be brought into action. The bombing by the attacking force will last about one hour.

Proposed long-distance flight

The Kasumigaura Naval Aviation Station will undertake a long-distance flight from Kasumigaura to Horomushiro, Kurile Islands, in the early part of April. Distance 2,500 miles both ways.

The planes to be used are not naval planes, but private planes, namely, a Dornier plane built by the Kawasaki dockyard, Kobe, which was tried out at the Kagamigahara army grounds on February 24, and the results were entirely satisfactory and a Bréguet sea plane built by Nakajima aeroplane works.

Trial flights with a 1924 type naval plane

The trial flights of the 1924 type naval experimental plane now being carried out at Kasumigahara are proving very satisfactory. The 450-horsepower Hispano Suiza engine has replaced the Napier Lion, and a duralumin propeller has been added.

The Mitsubishi Internal Combustion Motor Co. announces that all the other variations in design contemplated have been successfully incorporated in this plane.

During the trial flights the plane successfully carried a 700-kilo dummy bomb. The plane then proceeded to Nagoya where the bomb was dropped on a prepared target at the Mitsubishi works.

Other tests have been applied with gratifying results. The metal propeller enabled the plane to better its previous speed record by 10 miles an hour. The reconstructed machine can also reach the 3,000-meter level from a start on the ground in two minutes less than when equipped with the older propeller.

NOTE.—The above refers to Mitsubishi No. 4 torpedo plane. See item under "Miscellaneous" on this plane.

Recent accidents

A Hansa plane, belonging to the *Notoro* attached to the second fleet now at anchor in Kure, went out to welcome the returning first fleet on March 2, found trouble with her motor, and was forced to alight on the water. One of the destroyers came to her assistance and as soon as repaired will return to the *Notoro*.

NOTE.—From the above it appears that the *Notoro* is now being employed as an aircraft tender. It is now officially stated that this ship is being used as an aircraft tender during the period that repairs are being made to the *Wakamiya* which is now in reserve undergoing extensive repairs.

On February 4, a Fairey Pintail amphibian having a 450-horsepower Napier Lion motor with a petty officer as a pilot and carrying a lieutenant commander as a passenger left Kasumigaura Naval Air Station for Yokosuka for the purpose of making the regular mail trip. Soon after taking off trouble developed with the engine and the plane fell from a height of 100 meters into the lake. The pilot was killed and the passenger seriously injured. The plane was badly broken up.

While one of the first-class seamen attached to Omura Naval Air Station was making a practice flight in a 1921 type fighting deck

plane, trouble developed and the plane crashed to the ground killing him. The plane was completely demolished.

Four more F–5 flying boats completed

Two new F–5 boats were sent by air from Hiro to Yokosuka naval air station on January 26 and two on January 27. These machines are equipped with Lorraine-Dietrich 400 horsepower motors.

---

60 Bréguet planes ordered

It is reliably reported that Japan has ordered 60 Bréguet type 19 land planes equipped with a 400-horsepower Lorraine-Dietrich motor to be used as bombing planes. Some of these planes are being constructed in France, but plans and rights to manufacture have been sold to Japan.

[Source reliable]

Miscellaneous

Aircraft by types in active service at naval air stations (not all set up):

Avro training (sea plane and land plane)	130
Mitsubishi pursuit No. 1	60
Mitsubishi observation No. 2	50
Mitsubishi torpedo No. 4	20
Hansa sea planes	40
Yokosuka sea planes	40
F–5 boat	25
Fairey Pintails	2
Rohrbach	9
1925 type training sea plane	10
Total	386

Motors by types for aircraft enumerated above:

Benz, 130 horsepower	15
Hispano Suiza, 200 horsepower	100
Hispano Suiza, 300 horsepower	150
Napier Lion, 450 horsepower	30
Rolls Royce, 360 horsepower	50
Lorraine Dietrich, 400 horsepower	12
Bentley Rotary, 150 horsepower	60
LeRhone, 110 horsepower	110
Total	537

Aircraft in reserve and not at naval air stations by types:

Mitsubishi pursuit	35
Mitsubishi observation	30
Mitsubishi torpedo	25
Hansa sea plane	40
Total	130

The Rohrbach metal flying boat has not proved entirely satisfactory, in that some structural weakness has developed in the hull of the boat and trouble has been experienced with the metal alloy with which this plane is constructed. According to the source of information, production of this aircraft has not commenced and will not commence until the defects have been remedied. The Rolls Royce 360 horsepower motor has been found of too low power and will probably be replaced with the Hispano Suiza 450 horsepower motor.

A new type training pontoon sea plane equipped with the 130 horsepower Benz motor is now also in use at the Kasumigaura Naval Air Training Station. This type is of Japanese Navy design, but is very similar to the Avro sea plane. The design permits of wheels being substituted for the pontoons.

Some of the Avro training planes are now equipped with the Bentley rotary 150-horsepower motor.

Efforts are still being made to develop a ship catapault, but so far without success.

The designer Heinkel has been asked to design a submarine plane for the Japanese Navy. No submarine has as yet been equipped to carry a submarine plane. The Japanese Navy considers the submarine plane of considerable importance for prospective use in the numerous islands owned or under mandated control by the Japanese.

The following service types are equipped with radio:
F–5, Marconi type, 300 miles range.
Hansa, Marconi type, 50 miles range.
Yokosuka, Marconi type, 50 miles range.
Mitsubishi observation, Marconi type, 50 miles range.
Rohrbach boat, Telefunken type, 1,100 meters range.
Other types aircraft are not equipped with radio.

Aircraft radio installation is mostly of very inferior type.

Aircraft fire control is not in practical use, but is being studied.

The production of the Lorraine Dietrich 450-horsepower motors will commence about May 1, 1926, in the Tokyo factory of Nakajima. Three of these motors have been completed, with some parts imported.

Production at the Mitsubishi Internal-Combustion Engine Factory of the Hispano Suiza 450-horsepower motor has not yet started. This motor, though rated at 450 horsepower, is capable of developing 500 horsepower at full power.

Effort is being made to find a new type bombing plane and new types to replace the Hansa, Yokosuka, and F–5 types. No decision has yet been made, but the following types are being tested:

(*a*) Heinkel seaplane equipped with 300-horsepower Hispano Suiza.

(*b*) Heinkel seaplane equipped with 450-horsepower imported Hispano Suiza motor.

(*c*) Breguet XIX,

(*d*) Dornier bomber (new type constructed at Kawasaki, Kobe, see reference this office letter ONI–49–25, 906 of May 21, 1925, paragraph 5, subparagraph (j)).

(*e*) Navy type (designed and constructed by Japanese Navy engineers, characteristics not known, except reported to be of wood construction).

In the meantime the Hansa, Yokosuka, and F–5 types will be continued in production.

The Mitsubishi No. 4 torpedo plane is being altered to take the 450-horsepower Hispano Suiza motor. This motor, as previously stated, is capable of developing 500 horsepower and is lighter than the Napier Lion 450-horsepower motor, with which this plane is now equipped. It is expected that this alteration will result in increasing the speed, ceiling, and useful load.

Heaviest bombs at present used by the Japanese Naval Air Force weight about 500 pounds. Bomb sights introduced by the British air mission headed by The Master of Semphill are still in service use. One bomb sight of German design and manufacture has been seen.

Motor superchargers are not in use, but are being studied.

There is no coordination between the army and navy air departments regarding types of planes or motors.

N–2 type dirigible for Navy

A semirigid dirigible of 8,000 cubic meters (282,685 cubic feet), built in Italy for the Japanese Navy, is now being assembled at the dirigible station at Ciampino, Italy. This dirigible is of the "N" type, the same design as the *N–2*, except that the envelope has been increased in diameter to give 1,000 cubic meters more capacity.

It is believed that Japan decided to buy this 8,000 cubic meter semirigid instead of *N–2*. The *N–2* is now at the Ferrara airdrome and there are no indications that it will be delivered to Japan.

The assemblage of this 8,000 cubic meters dirigible is now well advanced. It is estimated that it will be completed in about two months.

One Japanese engineer (Commander Tsukahara) is in Rome studying the design and observing the construction of the dirigible. It was stated that Italian airship personnel will be sent to Japan for demonstrating the airship and for service in training the Japanese in the operation of lighter-than-air craft.

NETHERLANDS

AVIATION NOTES

There are at present six sea planes building in Italy for the Dutch East Indies Navy and are to be ready in the spring of 1926. These planes are Dornier sea planes, "Wal" type, equipped with Rolls Royce Eagle IX engines and are similar, except as to engines, to the plane used in the flight from Spain to South America.

There has been considerable criticism of the Government for ordering these planes outside of Holland, and the reason given for doing so was on account of the inexperience of the Dutch companies in building sea planes (boats) and the long time necessary for delivery.

At the present the aircraft industries of Holland are practically without orders and it is a question how much longer they will be able to avoid shutting down.

The Koolhoven factories was recently visited. This plant is situated on the outskirts of The Hague, and while small, has turned out some very good planes.

There are eight *FK–31's* about ready for delivery to Finland. There is a difference of opinion between the Finnish air service and the company as to whether these planes come up to specifications. The Finnish commission claims that the planes do not meet the climbing requirements and that generally the planes were unsatisfactory. Jupiter engines had been installed in these planes purchased by the Finnish commission on recommendation by the Koolhoven Co. The engines have failed to produce the desired performance. The company claims now that the planes should be fitted with high-pressure engines, but when the Finnish commission offered to obtain an engine of this type to conduct the test, the Koolhoven Co. refused to permit its installation unless the planes were paid for in advance. It was stated that the planes had been rejected by the Finnish Government.

There is one other plane completed, an *FK–31* fitted with pontoons, for the Dutch Navy. It is long overdue and the Dutch Navy has informed the company that it must be ready by April or the Government will cancel the contract.

Mr. Koolhoven, the designer, has just severed his connection with this company and is to engage in consulting engineering (aviation).

As far as could be learned the company has no further contracts.

The companies in Holland seem to have difficulty in meeting their dates for delivery, and this is the reason given by the navy department for recently placing a contract in Italy for six Dornier planes for the East Indies Government.

POLAND

NAVAL NOTE

The Polish Navy, to which the French Rear Admiral Jollivet has been assigned as technical adviser, numbers two gunboats of 350 tons and 16 knots (*Commandant Pilsudski* and *General Haller*), 6 former German torpedo boats, (*Kastrub* and *Mazeur* of 1,350 tons: *Krakowiak*, *Slazak*, and *Podhalamia* of 329 tons and 28 knots; *Kujawik* of 310 tons and 27 knots), 4 mine layers (*Czakka Newa*, *Reyhilwa*, and *Jaskolka*, of 230 tons and 12 knots), 4 small monitors (*Warzawa*, *Horodyszera*, *Pinsk*, and *Nieszyrzi* of 110 tons).

Apparently a building program is to be presented to the Polish Parliament which envisages the construction with 12 years of 3 cruisers, 6 flotilla leaders, 12 destroyers, and 12 submarines.

RUSSIA

AVIATION NOTE

Purchase of aperiodic compasses

It is reliably reported that the Soviet Government has recently purchased 800 aperiodic airplane compasses from a British firm.

SWEDEN

PROPOSED ORGANIZATION OF AIR FORCES

The following supplements the information given on pages 71–74, January, 1926, BULLETIN:

The new organization of the Swedish air forces according to the new defense proposal of 1925 provides for the following:

Aircraft school in Ljungbyhed consisting of one division (company) and three training divisions—annually about 48 pupils.

Flying Corps No. 1 in Upsala—one scouting, one bombing, and one pursuit division.

Flying Corps No. 2 in Västeros—one scouting, one bombing, one pursuit, and one torpedo plane company.

Flying Corps No. 3 in Karlsborg—one pursuit and one scouting company, with school for pursuit plane pilots in Malmslaeth.

Flying Corps No. 4 in Oestersund—one pursuit plane and one scouting company.

Corps No. 1 is directly under the supervision of the war department, No. 2 is for the navy, No. 3 and No. 4 are for the army. Detachments of the corps will be assigned when necessary to the coast fleet and the fortifications at Boden, Karlskrona, Gothenburg, and Vaxholm.

The planes will be kept in condition and repaired at the Government shops in Malmslaeth. New workshops will be opened in Vaesteras. The manufacture of new planes will be left to private concerns.

Some critics claim that the distribution to the army and the navy will break up the homogeneity of the fighting forces and no longer can carry out independent tasks. According to the new plan of organization, the air forces are merely a scouting agent for the land and sea forces and no longer represent an independent weapon. All corps should be placed under the immediate supervision of the chief military authorities.

SWEDEN

VISIT OF ROYALTY TO UNITED STATES

The following is the schedule as published by the Swedish press of the approaching trip of the crown prince and crown princess of Sweden to the United States:

On May 18 the royal couple will leave Goteborg on the motor ship *Gripsholm*, which is expected to arrive in New York on May 27. They will leave for Washington, D. C., to attend the unveiling of the John Ericsson monument May 29, returning to New York on May 31, where they will remain until June 11.

During their stay in New York there will be an official reception in the city hall and various Swedish-American functions will be attended. A visit will be paid to Mr. Edison. Philadelphia is also to be visited.

From New York the crown prince and crown princess will go on a long motor trip through the New England States, visiting New Haven, Worcester, Newport, Boston, and other places.

The United States Military Academy will also be visited.

From Boston it is planned to go to Niagara Falls and Detroit, where an inspection of the Ford plant is scheduled, and thence on to Chicago, where a few days' stay is contemplated.

The journey will then be continued to Minnesota.

If possible midsummer will be celebrated amid former compatriots in St. Paul and Minneapolis (a great festival season in Sweden). The crown prince and crown princess will then go on to Yellowstone Park, where they will take a short rest.

Thereafter they will go south via Phelps Lake, Rock Springs, and Salt Lake City to the mountain district between Utah and Arizona, famous for the grandeur of scenery. The journey will be partly by motor and partly on horseback via Vedar City, Zion National Park, and Bryce Canyon to Grand Canyon, to see perhaps the grandest natural formations on the entire North American continent.

The royal couple will then proceed to the West, being scheduled to arrive in California about the middle of July. The itinerary for California has not yet been definitely decided, but visits will undoubtedly be paid to Los Angeles, Sequoia National Park, San Diego, and Monterey.

The crown prince and crown princess will motor back to San Francisco, and they are expected to arrive about July 28.

It is now definitely decided the royal couple will return home via Japan, China, and India.

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FOR CONVENIENCE IN ROUTING

Officer	Initials	Date received	Date forwarded
Captain			
Executive Officer			
First Lieutenant			
Navigation Officer			
Gunnery Officer			
Communication Officer			
Engineer Officer			
Medical Officer			
Supply Officer			
First Division Officer			
Second Division Officer			
Third Division Officer			
Fourth Division Officer			
Fifth Division Officer			
Marine Officer			

The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

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O. N. I. MONTHLY INFORMATION BULLETIN

VOL. VIII MAY, 1926 No. 11

BRAZIL

PERSONNEL OF FRENCH MILITARY MISSION

The French military mission to Brazil consist of the following officers now on duty with the Brazilian Army: General Coffec, head of mission; Gen. Albert Quirin, Col. Louis Buchalet, Lieut. Col. Maurice Derougemont, Lieut. Col. Albert Lelong, Lieut. Col. Gabriel Barrand, Lieut. Col. Pierre Beziers Lafosse, Lieut. Col. Charles Lecoq, Lieut. Col. René Corbé, Lieut. Col. Marc Chabrol, Lieut. Col. Jean Jauneaud, Engineer Chief of Powders John Nicoletis, Maj. Auguste Desneaux, Maj. Georges Jasserson, Maj. Jean Gueriot, Maj. Raymond Dumay, Maj. Charles Guedeney, Maj. Maurice Presvost, Maj. Joseph Weller, Maj. Fernand Colin, Maj. Jacques Augier de Moussac, Maj. (Med.) Jean Bouissou, Major (Vet.) Marliengeas, Major (Vet.) Dieulouard, Capt. Armand Gloria, Capt. André Gauthier; three warrant officers called "administration officials"; one chemist; three technicians; and seven orderlies.

CHINA

RECENT EVENTS

April 26, 1926

[Source, O. N. I.]

By a perusal of the article in the April BULLETIN entitled "The Russian-Japanese Situation" it will be seen that it is impossible to discuss the external policies of Russia and Japan without bringing in China—the theater on whose stage a strategic battle is being waged continuously. It is useless for the purpose of obtaining a general view of the situation to follow the kaleidoscopic changes of minor generals, Peking governments, or the armies which disintegrate overnight and appear under another leader the next day. There are, however, certain recent events which, if properly evaluated, may show the general trend of events.

Probably the most important change which has occurred recently in China is the apparent wane of soviet power and popularity. This

is shown not so much by the much-advertised defeat and rout of Feng Yu Hsiang and his Kuominchun, or People's Armies, but by the many small indications, the most recent and unexpected of which is the news that the governor of Kwantung has begun the deportation of many of the Russian advisers from Canton. Nothing more than the bare news of this action is known, and it was surprising, as the Province of Kwantung was apparently united under the Red Section of the Kuomintang, or Southern Party, and was functioning smoothly along soviet lines with Red Russian advisers in all important posts. The British are the most highly interested in this particular movement, as it will probably mean the calling off of the boycott against Hongkong, which has been costing British interests around a million dollars a day.

Chang Tso Lin has demanded from Moscow the recall of the Russian Ambassador Karakhan from Peking, on the ground that he has abused hospitality by using his office to spread soviet propaganda.

The communist sections of many colleges have been attacked by the other students and the members very roughly handled. Undoubtedly many students now know that their comrades have been uselessly slain when, led by secretly armed soviet agents who have played upon their patriotism, the students have committed excesses and been fired upon.

It is an interesting fact that at about the same time that there was a serious rift in the Russian Government itself between Moscow and Leningrad there was also a clash between the different soviet elements in China. Russian propaganda was then at its height, and a commission from Moscow advocated beginning the so-called reign of terror. This was opposed by the element headed by Karakhan and Ilyin on the ground that the time was not ripe and the work of years would be undone. At present writing it would seem that the more conservative Karakhan and Ilyin won out with Moscow and had their way, but that the radical element was right, in that their chances were better in January and February than they are now in April. However, the soviets will not give up without a struggle, as China is their last chance, and huge amounts of money have been poured into the country in addition to the money, arms, and supplies furnished their creature, Feng Yu Hsiang, at such great effort in crossing the desert via Urga.

The worst enemy of Bolshevism in China is the Chinese nature. The Chinese are good Bolsheviks as long as the soviet money holds out, and it is believed that this applies to General Feng himself.

This latter individual, after making his drive right to the sea and taking Tientsin has now taken flight for Russia via Urga

with his family, chattels, 17 motor cars, and an unknown amount of money. He is advertised to take a trip abroad, but if he does so it will probably be at his own expense and not financed by the Peking Government, like the triumphal progress to Europe and the United States of the late "Little Hsu."

Feng's armies are scattered and retreating to the northwest in the vicinity of Kalgan. Before finally giving up Peking in April they invited Wu Pei Fu to come to Peking and take charge, but Wu, although a notoriously poor politician, failed to accept.

What effect the disintegration of the Kuominchun will have on Russian efforts in China is unknown. They have known for some time that they had a poor investment in Feng, but it was too late to change leaders and plans.

When Feng captured Tientsin in February ostensibly the Russians had at last their route to warm water and the situation was somewhat tense. The Japanese particularly did not care for this state of affairs. The customary thing would have been for the Mukden war lord, Chang Tso Lin, with or without Japanese urging, to come south and remedy the situation. However, Chang about this time was having troubles of his own. He could not trust Gen. Li Ching Lin, of Chihli, or Gen. Chang Chung Chang, of Shantung, and on top of this one of his leading generals, Kuo Sung Lin, revolted and marched on Mukden, probably after an understanding with Feng Yu Hsiang. Then the Japanese came to the front. By throwing extra troops into Manchuria "to protect their property rights" and by making certain restrictions covering the vicinity in which fighting could occur, they effectually spiked Kuo's guns. Kuo's army was defeated near Mukden and Kuo and his wife were captured and executed by Chang's troops.

About this time, early January, 1926, there apparently occurred a rapprochement between Chang and Wu Pei Fu. Wu Pei Fu had been gaining power steadily and in the latter part of 1925 began his march north, defeating the Kuominchun army under Yueh Wei Chun in Honan. Wu's old henchman, Sun Chuan Fang, then in control of the eastern Yangtze Provinces, after some wavering, decided to be at least friendly toward Wu. Lin Ching Lin and Chang Chung Chang made their drive on Tientsin, Wu pressed from the south, Chang from the north, and the Kuominchun retreat began, which did not finish until Peking was evacuated in April.

The situation, then, in the latter part of April is that Chang Tso Lin's troops are about to enter Peking, although recent reports state that the ninth division, formerly of the Fengtien army, has closed the gates and demanded from the committee of safety, functioning in place of a government, that this division be made

part of the Peking police force. Wu Pei Fu, in conjunction with Sun Chuan Fang, is in control of the Yangtse Provinces, and Wu's power is in the ascendency. This latter situation holds some slight ray of hope for more settled conditions, in that it is known that Tang Shao Yi, the old student and former premier, was back of Wu in his last move, and Tang has long been a leader of the White or Conservative Kuomintang of the south. Also Chang Tso Lin, who was becoming very autocratic and was even accused of trying to place his son on the throne, has had his confidence so badly shaken by the recent revolt of Kuo that he will not endeavor to hold Peking against Wu but will be willing to divide the spoils. However, to those who have "hope" so often before, it appears that the stage is probably being set for another contest for power between Chang and Wu.

The situation in Manchuria, where Russia faces Japan, has been discussed in a previous article. This always brings up the much-debated question of the exact relations between Chang Tso Lin and the Japanese. It is probable that now, as in years gone by, Chang simply has had the choice of two masters and has chosen the Japanese in preference to the Russians after experience with them both. Wu Pei Fu has always been hostile to the Japanese and likes the soviets little better.

A recent event which is of peculiar interest to naval officers happened in March, 1926, when the second Kuominchun army was in control of Tientsin. The exact provisions of the so-called Boxer treaties have been violated many times. The Peking-Mukden railway within the treaty zone has been fought over and blocked by Chinese armies many times, and the Peking-Tientsin railway blocked several times, and therefore the open route from "Peking to the sea" did not obtain. The procedure in these cases has usually been for the ministers of the treaty powers to make a formal protest and later to dispatch an international train with a few troops of the different nationalities on board to open communications. In the case of the recent fighting around Tientsin, when Feng was attacking Li Ching Lin, this train itself did not get through, and the foreign powers did not take the matter very seriously.

During the stay in Tientsin of the second Kuominchun army, however, an attempt was made to ship supplies and munitions to that army by water via Taku Bar. The Allies, as the Fengtien forces combined with the Chihli forces of Li Ching Lin and the Shantung forces of Chang Chung Chang were called, promptly retaliated by emplacing fieldpieces on the sites of the old Taku forts, mining the channel, turning off all navigational lights, and forbidding any steamer traffic whatsoever. This apparently was a horse of another color. The diplomatic body protested strenuously

and finally delivered an ultimatum, stating that, in effect, if communication was not open by a certain hour of a certain day the way would be opened by force. At the same time the diplomatic body requested their naval vessels present at Tientsin and Taku to carry out individually and collectively the terms of the ultimatum.

Exactly what discussion took place is not known, but probably there arose in the minds of the naval commanders the question of what would happen if the Chinese simply moved the fieldpieces inland out of sight or into a village and opened indirect fire. At any rate a message was dispatched to the diplomatic body, asking if the naval forces could count on the assistance of the army forces in Tientsin if necessary. The answer stated in effect that it was at least highly undesirable to use any land or landing forces in the operation. There still exist some doubts as to what would have happened if the Chinese had not capitulated.

A rather tragic sequel to this affair occurred. A large body of students, undoubtedly incited as usual by soviet agitators, gathered in Peking on March 17 and began a march to the Foreign Ministry and the house of the Chief Executive, Tuan Chi Jui, to protest against acceding to the demands of the foreign powers. Not finding Tuan "at home," they proceeded to the Ministry of the Navy and outside this place encountered a large part of Tuan's bodyguard. When the students tried to rush the building the bodyguard fired with such effect that about 50 students eventually died and 200 were wounded. A late dispatch states that the last act of the Kuominchun army before leaving Peking was to round up the bodyguard who did the firing and massacre them by machine-gun fire, only two or three escaping with their lives.

CHINA

VISIT TO CANTON ARSENAL

We left Shameen at 8.30 a. m. in the boat of Colonel Wai, the engineer of the Government arsenal at Canton. The arsenal is in the general direction of White Cloud Mountain and some 8 miles away by boat, which must follow the circuitous streams of the delta country. The conversation on the way up was occupied mostly with exchanges of recollections of the many skirmishes in and about Canton. Many of them are nowhere recorded, I believe, although very interesting and no doubt influential in determining the personnel and the policies of the present Government at Canton. Colonel Wai voiced the opinion of the Russians so often heard, which is

that at the present time their military knowledge is needed, and that this explains why they are retained. He believes that they will be thrown out as soon as their services can be spared or whenever they become dictatorial. As example, he cited the case of Borodin, who has recently left, due to the fact that Sun Fo had said that there is not enough room in Canton for both him and Borodin. Another reason: At the last meeting of the arsenal committee the Russian adviser tried to impose his opinion and was told that he was there in an advisory capacity only.

The first stop was at the old black-powder factory, which has not been in operation for a very long time, although the machinery is still there, and it could be started again; not, however, without considerable rehabilitation. This site is being converted into an additional cartridge factory. The machinery was obtained from Chan Kwing Ming's Swatow plant, which was recently captured by the Cantonese. It is being moved en masse to this site, including the metal-frame structures forming the housings. The machines are all of German manufacture. He stated that the capacity of this new plant would be about 35,000 cartridges a day, which would double the present output of cartridges from the arsenal.

We next went to the main arsenal, about 3 miles farther on. The grounds are very imposing. One approaches by a long brick walk through gates and arches guarded by well-fed, well-uniformed, and well-disciplined soldiers, who do an excellent "present arms." After tea at Colonel Wai's quarters we went down to the main office, where we met the director of the arsenal and the head of the repair department. The director is General Tung. I judge his age to be about 25. He was four years in Germany. He speaks no English. He is clean-cut, dignified, intelligent, very courteous, and pleasant. His brother, General Tung, was assassinated in Canton last year. His assassin escaped and has never been apprehended. He is always accompanied by a bodyguard of two men, who carry German Mauser rifle pistols in their hands ready for action. When he enters or leaves any division of the arsenal a guard of about 10 men is paraded in his honor.

The head of the repair department is Mr. Tom Williams, who was with the Ford Motor Co. for eight years. He is a fat, pleasant Chinaman, who impresses one with being from Detroit more than from Canton. He is anxious to return to the United States, but is having difficulties with his papers, which are now in the American consulate, Shameen.

The five of us had a very excellent luncheon. After luncheon we took inspection more seriously.

The offices and quarters were spacious, clean, and orderly. The drafting room is apparently of very little value; only one draftsman

was at work. He was making up instructional drawings of machine guns for field officers who, Colonel Wai said, had asked repeatedly for instructions on operation of the Thompson machine gun, but nowhere did I see working drawings. The drawings were more pictures than drawings. Evidently they do not use drawings to the same extent as does the foreign machinist.

The rifle factory is an enormous machine shop, employing about 600 laborers, who belong to labor unions the same as any other laborer and periodically demand something. The rifles start from stock metal of foreign origin shipped to the arsenal, and from this and native wood the factory completes the rifle and tests it so that it is in all respects ready for the soldier. The machinery equipment is excellent and the mechanics seem very proficient.

Many of the machines are duplicated in order to equalize the slow stages of manufacture with the faster stages; there are, for example, five boring machines for rifling. The standard product of manufacture is the German Mauser rifle or the carbine, both about the same as our 30:30. The daily output is from 30 to 45 of either one or the other. This can be speeded up to 60 per day by working night shifts. The cost of manufacture is about $60 each, local currency, which is about $30 gold.

In addition to rifles they make Maxim machine guns and Thompson machine guns, both United States inventions, and just a few revolvers. But any of these must be almost entirely handmade, and the production, therefore, is very slow. In the case of machine guns it is 5 to 7 per month. Wai said that 43 Maxims had been made and about 200 Thompson guns, and that these are now in service. The testing room where the metal is tested is well equipped. It contains, in addition to the metallurgical testing equipment, a chronograph for taking velocities, of the Boulonge type but of German manufacture. Practically all machinery is of German manufacture, athough I saw one or two United States machines.

After this I was invited to shoot on the testing range, which consists of crude targets suspended in front of an embankment at an approximate distance of 50 to 75 yards. First I fired a carbine, which in principal parts is little different from our Springfield or the Mauser rifle. They are all of the sliding-bolt type. The cartridges are loaded into the magazine from a clip, the same as in our rifles. The sights are more difficult to use than ours. They are not fitted with a windage scale and very little attention is paid to the peep sight. They apparently never set range on sights. The report is not as loud nor is the recoil as great as in our rifle, but the performance is very good. The dispersion is not excessive. The muzzle velocity is 700 meters per second. Next they brought on an Austrian machine gun using a cartridge of about caliber .30, and very similar

in construction to the Maxim. It is belt-fed, water-cooled, and has massive parts. It is extremely heavy and clumsy. It jammed frequently. The Maxim gun was some improvement on the Austrian gun in performance, but is almost identical in construction with the American design. It suffered many jams, too. Neither of them would pass a service test. They were reluctant about firing the Thompson gun. I don't know why; possibly because it uses Colt .45 ammunition, which they may find very difficult to get. The last demonstration was with the German Mauser pistol made in Germany. It is the personal property of Colonel Wai. In spite of making fairly good weapons, the officers always carry the German-made Mausers.

The cartridge factory is complete but offers no new tricks in manufacture of cartridges. They begin from sheet metal, from which disks are first stamped, after which they pass through the several drawing stages until the cartridge case is completed, after which they pass to the loading plant. The projectile jackets are received at the factory as small cup shapes from which they are drawn to shape and filled with lead. Fulminate of mercury caps are used, and I was informed that they are loaded at the cartridge factory, but was not shown the fulminate plant. However, caps are very cheap, easily obtained, and are easily shipped. I obtained a sample of each stage of manufacture of the cartridge.

In the machine shop there were four or five field or mountain guns of foreign manufacture of caliber 3 inch or less. I was informed that they make ammunition for these two, and saw some brass cases which had been machine turned, but no projectiles were produced, although I asked to see them. In addition they asked me very particularly and in detail about powder for these guns, which indicates to me that they are trying to produce ammunition for these fieldpieces. I think there is no doubt that the often-reported field or mountain guns are very rare and unreliable, although it is certain that they have a few of foreign manufacture and may have obtained some ammunition with them. At present they are making no ammunition for these guns.

We then started for the powder factory, several miles away. The director accompanied us. At the powder factory we were met as usual by the head men—the guard was paraded for the general. We had tea; then proceeded to the powder factory. The head man, Mr. Lum, was, I was informed by Mr. Wai, three years with du Pont in the United States, but, unfortunately, he is away at Swatow in charge of transporting Chan Kwing Ming's arsenal machinery to Canton. The chemist, who speaks no English, got his knowledge of powder in Japan.

Their powder is a straight single-base nitrocellulose powder of about 12.3 per cent nitration as compared with our 12.6. Their method of manufacture differs very slightly from our own. Their washings and, therefore, the reduction of impurities is inferior to our own, which may result in a less staple product, but, in spite of this, their fundamental methods are correct. The colloid is pressed through dies coming out in shreds, which are bundled and fed through a cutting mill, the result being a very small grain, similar to our small-arms powder. Finally these are put in a shaker with graphite and given a graphite coat, which is not done with larger gunpowders. Their plant has no dies for larger gunpowders, but dies are all that would be required to convert this plant into a large gunpowder plant, and by a slight increase in nitration they could produce guncotton for mines or torpedoes. Whether they have ever made any guncotton or considered making any I do not know. I asked about the mines recently used at Boca Tigris and was informed, vaguely, that they were loaded at Whampoa. No one knew anything about them. I expressed surprise to learn that there is a loading plant at Whampoa. Wai said that there was, but none too convincingly. I obtained a sample of each stage of manufacture of the powder.

The laboratory of the powder factory was very incomplete. They informed me that the soldiers had destroyed the equipment during the various campaigns. There is apparently no testing of powder undertaken. They depend on the plant to produce powder of sufficient stability to hold up until used.

During the inspection I sighted 15 or 20 "dumdum" cartridges. I was informed that some of these had been made previously but none were being made now.

In addition to shops and plants and necessary storehouses and quarters, the arsenal has an officers' club—very comfortable and well appointed—and a school for the workmen, where they are taught at night.

I was informed that, in addition to the present cartridge factory and the one under construction, which they estimate will together have a daily output capacity of about 70,000, and that there is a small cartridge factory near Canton.

I was extremely surprised at the excellent grounds and buildings, the modern equipment, organization, and administration, the excellent discipline among the soldiers, and the hospitality of the officers. We returned just before dark, the director with us. During the day I inquired several times about Whampoa and have hopes of being invited to inspect it.

The arsenal employs altogether 1,800 men. Their monthly running expenses are about $200,000, Canton currency. While the

arsenal formerly was controlled by the most influential general in this vicinity, or the one contributing the most money to the arsenal, it is now controlled by the military council.

FRANCE

NAVAL NOTE

The 600-ton submarine *Nymph* was launched April 1, 1926, at Nantes.

GERMANY

NAVAL NOTES

Launching of Moewe

The first large torpedo boat constructed after the war (*W–102*) was launched on March 4 at the navy yard in Wilhelmshaven. The boat was christened the *Moewe* by Commander (Count) zu Dohna (German Navy, retired), the former commander of the auxiliary cruiser *Moewe*. This initiates the future practice of the navy of giving the torpedo boats names in place of merely designating them by numbers, as was done before the war. The other 11 boats now under construction will also be given historical names.

Progress of vessels under construction

The percentage of completion of vessels under construction for the German Navy is given as follows:

Torpedo boats

W–102, about, 75 per cent; *W–103/105*, about 15 per cent; *W–106*, about 10 per cent; *W–107*, about 10 per cent.

The above percentages are merely approximate. No data can be given yet regarding cruiser *B*.

GERMANY

GERMAN VIEWPOINT ON DISARMAMENT CONFERENCE

A responsible member of the Reichswehrministerium (Ministry of Defense) in conference gave the following opinion on the coming disarmament conference:

The German Government will be represented at the disarmament conference, when it takes place, by members of the Foreign Office and by the following officers attached to the German Army headquarters: Admiral von Frieburg, Colonel von Stülpnagel, Lieutenant Colonel Dumlein, and Major Schindler.

The names of the army and navy delegates have not been published, but there will probably be no change in the above. The Reichswehr Ministry considers that Germany has been disarmed and it is impossible for them to go any further. Their policy at Geneva will be to cause the other nations, especially those countries which have universal service, as France, Poland, Czechoslovakia, Belgium, Rumania, and Italy, to disarm to the extent that Germany has already disarmed. They have no expectation at all that this will be carried out. They look at the conference with complete skepticism and count upon no definite results. The Reichswehr Ministry also believes that in pursuing this policy they are proceeding on logical ground. They believe that if, as an alternative, Germany would suggest that their army and navy be increased commensurate with their desires and in proportion to the other countries, that France and her supporters would immediately remind Germany that the treaty of Versailles was still in force. The Reichswehr Ministry believes that France would then state that Germany's action on these premises was in an effort to employ the disarmament conference to increase her army and to avoid the treaty of Versailles.

They do not expect Russia will change her demands to have the conference take place elsewhere than in Geneva, preferably in Brussels. The Reichswehr Ministry is rather vague on whether Russia was merely using the objection to Switzerland as a pretext for avoiding entering negotiations. Germany apparently has no objection to Russia's maintenance of a large army, as Germany looks toward Russia as a possible active ally. In any case Germany, as usual, mistrusts France. Germany is very desirous of seeing the French Army reduced. It does not expect that France will be willing to reduce her army until her financial difficulties are straightened out.

Germany does not expect the disarmament conference to take place on May 15. It will probably be long delayed. They look upon the disarmament conference as entirely a political issue and expect the military experts to play little or no part. If the political issues come to a standstill they believe certain technical questions will be referred to military committees and let them hang fire there several months until the political atmosphere can be cleared up.

The Reichswehr Ministry believes that Great Britain can not further reduce her land forces. She had such heavy commitments overseas that it would be unsafe to reduce any further.

The Reichswehr Ministry considers that the question of disarmament does not apply to the United States, as the latter has already disbanded its war-time conscripted Army and that the Regular Army has been reduced to a point below the requirements of the United States. The Reichswehr official stated that the American Army was much smaller than the German Army in proportion to the respective populations.

It is believed that the Baltic States will not reduce their armaments until the Russian danger is removed.

GERMANY

GERMAN COOPERATION IN THE RESTORATION OF THE RUSSIAN MILITARY INDUSTRY

[Translation of a German intelligence report which embodies a German translation of a communication by a Russian anti-Bolshevik agent for their organization out of Russia]

The following report regarding German-Russian cooperation in the restoration of the Russian military industry comes from one of the Russian (Party of the Right) anti-Bolshevik intelligence centers. It is probable that it was delivered to one of the foreign intelligence bureaus. The report is dated the 29th of October, 1925, and is a typical instance of those reports which are so extremely harmful for Germany when communicated abroad.

The treaty of Rapallo, establishing the mutual relations between Germany and the S. S. S. R., has built the basis for a close cooperation of both countries for the restoration of their economic conditions as well as their political prestige, shaken by the World War and its consequences.

Both countries, severely damaged, but still remaining great from the point of view of their political importance, have naturally formed a bloc, united by their mutual hatred of the Versailles treaty and the political régime established in Europe as well as in Asia by the victorious allied powers.

Rapallo was the basis on which has been established the many government and private agreements which have introduced mutual friendliness into the relations of both countries. The agreements concluded by the soviet economic organizations and syndicates on one side and the German industrial organizations, like the "Reichevarband Deutscher Industrieller," "Vereinigung der Vaterlandischen Industrieverbando," or various German parties, on the other, have generally played a far greater rôle than the government agreements. One can state that the government conventions are merely completing the agreements of the private groups.

The restoration of the ruined Russian industry could not be managed without German support. The soviet political leaders insisted on making first the restoration of the Russian military industry. Not having sufficient technical specialists, they had to accept a large technical support granted by Germany. At the same time this gave Germany the possibility of getting rid of the surplus technical forces and an opportunity of expansion of the military industry. This expansion creates for Germany enormous reserves of military materials and equipment which can be of the greatest use in case revenge becomes possible. On the other hand, the soviet government, by having the military industry restored mainly by German technical forces, was enabled to improve the condition of the army to an extent where they could be sure of its strength and efficiency. Fearing nobody, they could continue to work on the preparation of world revolution which was and always will be the greatest aim of the Komintern and the soviet government.

The main branches of military industry which had to be restored were:

(1) Dockyards and shipbuilding plants.

(2) Ammunition and gun manufacturing as well as machine plants.

(3) Powdermills, chemical factories, and laboratories.

(4) Airplane, motor, and automobile plants.

Germany had an excess of specialists for all these industries and could easily supply the S. S. S. R. with the necessary technical experts without any intermediation of the German Government. The Government had only not to oppose, and everything was done by private agreements, which opened for the German technical forces the perspective of good conditions and remuneration in Russia.

In 1922 the migration of technical specialists to Russia took quite feverish forms. The soviet trade delegation (to Berlin) engaged large numbers of the best engineers and workmen, paying them double salaries. This migration of German technical forces to Soviet Russia was very cleverly organized by Stomoniakoff (head of the soviet trade delegation to Berlin), Professor Lemonosoff (famous railway expert), Abramoff, and others.

Their first effort was to send to the S. S. S. R. several engineers of the Vulcan Works in Stettin who were intrusted with the restoration of the dockyards and shipbuilding plants in the Kronstadt region (near Leningrad) and in Nikolajeff (Black Sea). The qualifications which were required were as follows: Experience in building and equipping submarines and experience in complicated remounting works.

The following persons were engaged from the Vulcan Works, Stettin: Engineers P. Krueger, Alexander Bode, Jakob Grabner, A. Brinkmann, Richard Hettge, G. Klockner, and Johann Huber; Foremen Christian Nolde, Oscar Fischer, Heinrich Krieger, Fritz Kurt, Karl Belski, and others, the total number being 110 persons.

The Weserwerke-Bremen sent 3 specialists for the construction of submarines, and 60 skilled workmen.

The Schichauwerke-Danzig sent 5 engineers and 30 skilled workmen. The Government works in Hamburg supplied two of their best engineers—Major Hagen and Captain Meissner—who are at present in Kronstadt (near Leningrad) supervising the shipbuilding and repair work.

At the same time eight submarines were purchased through the intermediation of the "Orgesch" organization, which were transmitted to the harbors of the Gulf of Finland and to the White Sea. The negotiations with the "Orgesch" organization in these matters were carried out on behalf of the soviet government by M. Peter Diduschok, mandatory agent of the Komintern and of the soviet foreign secret service (former Austrian officer of Ukrainian extraction residing at present in Berlin).

Restoration of the ammunition works was very difficult, in view of the unsatisfactory conditions of the machinery. According to the clauses of the Versailles treaty, a large number of government ammunition works in Germany had to be closed; for instance, the enormous Erfurt Works. They were closed in due time, but their technical equipment disappeared. As a matter of fact, it was transferred to the S. S. S. R. in 1923 and established in the Tula Ammunition Works and in the Perm Arsenal. To the same industrial plants emigrated the numerous employees of the Erfurt Works, excepting five or six who were undesirable for the soviet government owing to their political views. Almost the entire staff of the Erfurt Works, numbering about 2,300 persons, including engineers, foremen, and skilled workmen, are now employed at the Perm Arsenal, which is at the present time the best ammunition and gun factory in the S. S. S. R. Likewise the surplus machinery which had to be liquidated by Krupp's agricultural concession (Krivoi Reg. Ukraine) were secretly transmitted to the Kieff Arsenal, the Votkinski, and the Izevski Works in the Urals.

The restoration of powdermills and chemical plants was considered a matter of the greatest importance. Professor Ipatjeff (former artillery general and professor of the Artillery Academy, Petersburg), during his trip through Belgium, France, and Germany, entered into close contact with Professor Haber and engaged, through his intermediation, a group of engineers, chemists, and

chemical manipulators (laborants) for the restoration of the main branches of the Russian military chemistry. Twenty-seven engineers and chemists were engaged on different dates—Hoppe brothers, Wilhelm Walter, Ruge Arenssohn, Ritsch Keppke, Grenwitz, Kruger, Linkwitz, Weber, Glickelman, Defressen, Seifkert, and Zichlek. Later, the soviet chemist, M. Fischman, who was educated in Germany, with the help of Engineer Novikoff, engaged over a hundred engineers, foremen, and skilled workmen in Darmstadt and Höchst, to which places he was especially delegated. This staff was sent to the S. S. S. R. and employed in the following factories: Ochtenoki powdermills, Leningrad; Schostenski powdermills and chemical works; Saratovski powdermills and chemical works; arsenal at Nikolajeff; arsenal at Sebastopol; arsenal at Kieff; arsenal at Moscow; and arsenal at Leningrad.

The assistance of these men was of the greatest importance for Russian industry and science, for Russia, who has plenty of brilliant inventors and scientific forces, was extremely short in efficient and experienced technicians for carrying out the practical works. At the same time it gave German chemists the opportunity to develop the newest inventions made in German chemistry, which could not be carried out in Germany in view of the control of the allied powers.

The airplane and automobile works were restored in great haste. At the present moment, for instance, the following factories are carrying out this production in the S. S. S. R.: Duks Works (12 branches); Junkers (9 branches); Fokker (4 branches); Albatross (5 branches), newly established.

The production of airplanes and motors is increasing so successfully that it is expected that in 1925 the importation of these articles will be stopped. The "Dobrolet" is an excellent school for aviators. The increase of aerial communication constantly requires new quantities of aviators. The "Doruluft" and the aerial communication lines of Junkers need workers and pay high salaries. The development of the airplane industry is considered a matter of the greatest importance, for, according to the soviet military plans, soviet aerial forces must exceed by 100 per cent the united aerial forces of the S. S. S. R.'s western neighbors—Poland, Rumania, and the Baltic States.

The cooperation of Germany and the S. S. S. R. in all these respects is so close that it is impossible to expect any alteration of the existing situation or get any influence over the same. One can state, in any case, that the strength of the Red army, which is the result of this cooperation, is already, and will be in the future, an extremely serious stimulus, able to play a great practical rôle.

MILITARY INDUSTRIAL PLANTS ACTUALLY WORKING IN THE S. S. S. R.

Ochtenski powdermill, Lenigrad:
Production: Gunpowder; piroksilin for rifles and artillery; smoke materials; nitrous products.
Workmen: 1,100.
Supervised: Military Industry Committee.

Kazanski government factory of explosives, Kazan:
Production: Nitrous cellulose; nitrous products; pyroxylin; nitrous acid; sulphuric acid.
Workmen: 1,520.
Supervised: Military Industry Committee.

Government factory of explosives, Samara:
Production: Melinit; trotil; nitroglycerin (dynamite); tetril. Capsule production will be established in the immediate future.
Workmen: 940.
Supervised: Military Industry Committee.

Nikolo-Schuravski government powdermill (St. Nikolo-Schuravskaja, Don Province):
Production: Mine powder and gunpowder.
Workmen: 65.
Supervised: Chemical Industrial Syndicate.

Kishtimski government dynamite factory:
Production: Dynamite for mining; nitroglycerin; nitrous acid.
Workmen: 402.
Supervised: Ural Chemical Syndicate.

Moscow cartridge factory, Moscow (cartridge factory of Russian-Baltic Anon. Co.):
Production: Gunpowder; capsules; cartridges.
Workmen: 150.
Supervised: Ochotvarivtorg Co. (Shooting National Trading Co.).

Kunsevo piston factory (see Cartridge factory):
Production: Shooting materials.
Workmen: 110.
Supervised: Ochotvarivtorg Co.

Tavatujski dynamite factory (Oral Explosives Co.), Rasiased Perm Railway:
Production: Dynamite.
Workmen: 116.
Supervised: Ural Chemical Syndicate.

Slavianak Ikrin factory, Slaviansk near Charkeff, Ukraine:
Production will be reestablished after January, 1926.

Government factory of chemical products and explosives (French-Russian Co., St. Shterovka, Donietz Region):
Production: Nitrocellulose; toluol; trinitrotoul; trotil; melinit; tetril; picric acid; sulphuric acid.
Workmen: 466.
Supervised: Military Industry Committee (rented from Supreme Economic Council).

Slavianoserbski factory of explosives, Slavianoserbak, Ukraine:
Production: Gunpowders.
Workmen: 25.
Supervised: Private lease.

Southern factory of explosives (Russian Gunpowder Co.), St. Rubeshnaja, Ekaterininski Railway, Ukraine:
Production: Gunpowders.
Workmen: 80.
Supervised: Chimugol Syndicate (Coal and Chemical Syndicate).
Lugansk government powdermill, Lugansk, Ukraine:
Production: Nitrocellulose and other nitrous products: pirokailine; smoke materials (naphthalinstuff).
Workmen: 310.
Supervised: Military Industry Committee.
Schostenski government powdermill, Schestka near Samara:
Production will be stopped March 1, 1926.

GREAT BRITAIN

MISCELLANEOUS NOTES

[From the British press]

H. M. S. "Centurion" to become target ship

The Admiralty have given orders for the battleship *Centurion*, now serving as flagship of the vice admiral commanding reserve fleet, to be paid off for conversion at Chatham into a target ship for the Atlantic Fleet in place of the battleship *Agamemnon*. The *Centurion* will shortly become due for scrapping under the Washington naval agreement.

The *Weymouth*, cruiser, left Plymouth April 1 for Portsmouth to replace the *Centurion* as flagship of the vice admiral commanding reserve fleet.

Battleship refits

Since the numerical strength of the battle fleet is restricted by the Washington treaty, it is natural that the Admiralty would desire to maintain such ships as we have in the highest possible state of efficiency. To this end a fairly large program of reconstruction is being carried out. In recent years the five ships of the *Royal Sovereign* class have been fitted with antitorpedo bulges, while important additions have been made to the armor and underwater protection of the battle cruisers *Repulse* and *Renown*. A start has now been made with the work of modernizing the five *Queen Elizabeth* battleships, the *Warspite* being the first to undergo this process. She is to be commissioned at Portsmouth next Tuesday to relieve the nameship of the class as flagship of Admiral Sir Roger Keyes in the Mediterranean. The *Warspite's* appearance has been com-

pletely altered by the reconstruction. The most striking change is in the position of the funnels, which are now trunked together, the base of the first funnel having been curved backward and cased in with that of the second. By means of this arrangement the navigating position and the fire-control stations in the forward part of the ship are kept free of funnel smoke. It is understood that the other four ships of the class will be treated in the same way, and will also receive bulge protection. It is apparently not intended that the five oldest units of the battle fleet—the four *Iron Dukes* and the *Tiger*—shall undergo extensive refit, as these vessels are due to be scrapped in 1934–35. The *Iron Dukes* are now to be formed into a training squadron for boys and will be attached to the Atlantic Fleet.

Destroyer tests

Presumably it is the intention of the Admiralty thoroughly to test the new destroyers *Amazon* and *Ambuscade* before any more ships of this type are ordered. If this surmise is correct, the decision is interesting in view of the fact that these boats are designed according to the ideas of their builders, Messrs. J. I. Thornycroft and Messrs. Yarrow, respectively.

The First Lord's memorandum on the navy estimates states that these ships will be finished during the coming financial year, so that the nine destroyers which are to be built under next year's estimates need not be laid down until the *Amazon* and *Ambuscade* have been thoroughly tried and the best points of their design decided upon.

It was the Admiralty's policy in the nineties and the early days of the twentieth century to permit the private shipbuilders to work their own ideas into the designs of their destroyers and to make a careful note of the best feature of each against the time when the department was to undertake its own designs.

New cruiser contracts

The allocation of names to the contract-built cruisers of the 1925–26 program is now officially announced, and the laying of the keels of these ships may therefore be expected very shortly. Messrs. Beardmore & Co. (Ltd.), Dalmuir, are to build the *Shropshire* and Messrs. Hawthorn, Leslie & Co. (Ltd.), Hebburn-on-Tyne, the *Sussex*. The two dockyard ships in the same program, the *London*, at Portsmouth, and the *Devonshire*, at Devonport, have already been begun on the slips vacated by the *Suffolk* and *Cornwall*, respectively.

but the financial provision for the coming year is larger in their case, On the *London* £793,785 is to be spent by March 31, 1927, and on the *Devonshire* £790,888; but the sums allocated to the *Shropshire* and *Sussex* are £560,071 and £556,458, respectively. With the putting in hand of these four ships the total number of British cruisers under construction is 11, the others, including the Australian ships *Australia* and *Canberra* and the five authorized in the MacDonald program of 1924. The last named are now all afloat, the last of these to take the water being the *Berwick*, which was launched at the works of the Fairfield Shipbuilding Co. on March 30 by Lady Stirling-Maxwell.

H. M. S. *Enterprise*, commissioned at Devonport April 7 as an independent command for service in the fourth cruiser squadron on the East Indies station. This is the last of the many war-time cruisers laid down in June, 1918, at the Clydebank works of Messrs. John Brown & Co. (Ltd.) and transferred after her launch on December 23, 1919, to Devonport Dockyard, where her machinery has been installed. The total estimated cost of the ship, including guns, is £1,759,975. She will relieve the *Cairo*, Capt. E. O. Cochrane, at present at Colombo, which will refit at Devonport in July and then go to the North American station to relieve the *Curlew*.

Engines for new dockyard cruisers

It is announced in fleet orders that the two new cruisers of the 1925–26 program to be built in the Royal Dockyards will be engined as follows:

H. M. S. *London*, Portsmouth dockyard, by the Fairfield Shipbuilding & Engineering Co. (Ltd.), Govan.

H. M. S. *Devonshire*, Devonport dockyard, by Messrs. Vickers (Ltd.), Barrow-in-Furness.

Trials of "L–27" completed

The new submarine *L–27*, which has been completed at Sheerness Dockyard and carried out her acceptance trials last month, has joined the fifth flotilla at Portsmouth as tender to the *Dolphin*. The submarine, like *L–26*, completing at Portsmouth, was laid down by Messrs. Vickers (Ltd.) in the last year of the war.

The large seagoing submarine *X–1* has also joined the fifth flotilla.

Long cruise of "X–1"

Submarine *X–1*, the largest vessel of her type in the world, a submersible cruiser with a surface displacement of 3,600 tons, has left Portsmouth for Gibraltar and will probably extend her cruise halfway around the world.

This trip is no doubt the first stage of an experimental voyage similar to that carried out to Singapore and back by submarine *K–26* in 1924 and will extend to about 20,000 miles. First commanded by Commander (now Capt.) R. H. T. Raikes, and since January of last year by Commander P. E. Phillips, submarine *X–1* has been carrying out trials and experimental runs in home waters for over two years. She had a special series of trials a year ago, following her official trials just before Christmas, 1924, and last September and October went to Portsmouth for gunnery tests by the staff of the Whale Island Gunnery School and other trials. So recently as February she made full-power runs in the North Sea in the presence of Admiralty officials, and followed these with speed tests over the measured mile in the Thames Estuary.

The *X–1* has been assigned to the fifth flotilla. She is the first underwater craft to have a ship's canteen.

Progress of salvage of German ships

With the raising of the German destroyer *B–109* at Scapa Flow, the twenty-third boat to be recovered, there remain only two more destroyers to be brought to the surface. A start has now been made by Messrs. Cox & Danks, who are conducting the operations, on the salvage of the battleship *Hindenburg*.

Seaman and "A. B." ratings

The experiment, if such it may be termed, under which an ordinary seaman in the Royal Navy could be rated "A. B." after six months' service in the former grade, has now been disallowed. There may be exceptional circumstances in which such a course might be justified, as in the case of a youth who had joined the service from the fishing industry, with a general knowledge of the sea imbued in him from his earliest consciousness and a seafaring instinct due to long heredity. But these instances are merely the exception which prove the rule. Experience has shown that six months as an ordinary seaman is a totally inadequate period in which to produce an able seaman in the present-day definition of the term. And so in future the period is to be 18 months, although in ex-

ceptional cases a captain may rate an ordinary seaman "A. B." after 15 months if he is satisfied that his qualifications justify the advancement. Time spent in training classes is taken into account, and it is laid down that an ordinary seaman must have served at least nine months in a seagoing ship to be eligible for the higher rating.

Ships gunnery and torpedo improvement funds

Grants to gunnery improvement funds are payable to His Majesty's ships in full commission or in commission with reduced crews. Grants to torpedo-improvement funds are payable to His Majesty's ships in full commission and to seagoing vessels with reduced or special complements which carry their torpedoes on board. The grants are payable annually in advance, in accordance with the scale shown below. His Majesty's ships in reserve are not eligible for these grants. Ships newly commissioned may draw on commissioning the proportionate amount due for the year in which commissioned. The moneys may be expended upon such objects as entrance fees for competitions and minor fittings and devices not included in the usual equipment but which tend to promote gunnery efficiency. It is, however, specially pointed out that no portion of these grants is to be expended in prize money or as an emolument for any person in the navy.

Gunnery improvements funds

	Per annum each £	s.
Battleships and battle cruisers	10	0
Cruisers of 8,000 tons and over and large aircraft carriers	8	0
Cruisers under 8,000 tons, large monitors, destroyers, and submarine depot ships	5	0
Small monitors, sloops, gunboats, flotilla leader destroyers	4	0
Patrol boats, submarines, and other independent commands not included in above	2	0
Yachts, trawlers, drifters, and tenders not provided for in above	0	10
Battleships, battle cruisers, cruisers of 8,000 tons and above, and aircraft carriers of 17,000 tons and above	20	0
Cruisers under 8,000 tons and aircraft carriers under 17,000 tons	10	0
Flotilla leaders and destroyers	3	0
Submarines	4	0
Coastal motor boats fitted with torpedo armament	0	10

India's defense problem

[From a consular report]

Air mastery is considered to be a vital factor to the successful defense of India. At least this seems to be the general trend of

opinion among London officials as well as officials in India, as indicated in recent press reports. They have carefully measured the striking force which an opposing power might use in its attack and have drawn a very striking comparison between India's war force and the forces of border countries.

In a recent press report it was pointed out that the Russian air force in Turkestan had vastly improved in quality and had increased in quantity during the past year; that the Afghan air force, which is chiefly manned and machined by Russians, now has 12 serviceable machines and that it is proposed to increase the number of fighting machines to 30.

Against India's lack of antiaircraft guns and antigas measures Russia is reported to be able to throw a fairly well equipped force. India's six airplanes are reported to be much slower than the Russian airplanes at Kabul and otherwise inferior in the matter of latest improvements. It has been suggested there is urgent need for additional squadrons in India equipped with modern fighting equipment and considerable agitation is going on to secure this needed force.

It has been emphasized by the Journal of the United Service Institution of India that air supremacy is of the utmost importance to the successful conclusion of future wars conducted against India, and it points out, in this connection, that—

(1) At the outset, possibly before the formal declaration of war, both sides will conduct an intensive bombing campaign, with the object of destroying their opponent's nerve centers, alarming the civil population, and hampering all military preparations.

(2) Coincidentally with these attacks there will be an attempt to attain air superiority by the destruction of the enemy's aircraft and air bases.

(3) Following this grand bombardment, the war will begin more or less normally on land and sea, it being assumed that it will be highly dangerous to start concentrations or overseas movements of large forces till the first phase of this intensive bombardment has expended itself. The air staff goes one step farther and assert that it is now within the realms of possibility that the results of this initial bombardment may be so far reaching as to end the war without recourse to the more normal methods.

The older services are, quite naturally, somewhat skeptical of this latter possibility. Yet, considered apart from wholly natural service prejudice, it is undeniable that this development may come.

The editorial notes in the United Service Institution Journal on this year's maneuvers in the northern command area confess that the most salient feature was the paralyzing effect which a hostile air force of even moderate strength has on the movement of ground

troops. Troops can not move at night and rest by day, for in the east effective rest by day is impossible owing to the heat, flies, and the innumerable duties which can only be properly performed by daylight. Above all, movement by night implies detailed reconnaissance by day. Besides, constant travel, lasting perhaps for weeks, over the roads in India would have a very disastrous effect upon the physical condition of troops, and should the approach march last for weeks instead of days the troops might have lost practically all their fighting value long before a shot was fired.

The necessity for night movement also seriously complicates the question of bringing up supplies and baggage for the fighting troops and demands a higher standard of march discipline on the part of transport personnel, which must learn to move in definite formations, clear of the roads, and be able to change these quickly when the terrain requires or when an air attack is imminent. The possibility of transport panic is also increased. Refilling points could not be protected from air attacks.

The handling of armored cars is described as bitterly disappointing, owing to the nature of the country, which remained unaltered almost throughout the operations.

To sum up, the maneuvers seem to have been a signal testimony to the overmastering first necessity of air supremacy and the necessity for augmenting the present force with airplanes and their appurtenances of the most modern designs.

ITALY

MISCELLANEOUS NOTES

Naval

On March 14, 1926, the mine sweeper and mine planter *Legnano* was launched in the Ancona yard.

Aviation

Italian airplane construction

Visits to a number of Italian aircraft factories lead to certain general conclusions.

The flying-boat type is being adhered to generally by C. A. N. T., S. A. I. A. (Savoia), and Macchi, the principal builders of seaplanes. American and British success with the twin-float type seems to have made no impression in Italy. Even the Macchi engineers who

visited the Schneider cup races in Baltimore in 1925 show no signs of changing their type design or construction. The only record of an effort to develop a twin-float type is that of Piaggio, who designed a twin float machine for the Schneider race two years ago, but never built it. Recently Piaggio won a design competition for a combat seaplane with a design showing a fuselage and a central float.

Macchi has been trying to make a torpedo plane of a flying boat. His experimental M–24 type had a door in the boat bottom to drop the torpedo through. As would be expected, this feature is now abandoned and the boat was seen with its bottom decked over. Instead, the torpedo is carried on the right side of the boat under the wing, with a guide on the side of the boat to drop the torpedo clear without rolling it over. From the looks of this rig, it is doubtful whether torpedo-plane work in Italy is being seriously pushed.

Both Macchi and S. A. I. A. continue to build light boxlike boat hulls of plywood with a multiplicity of light transverse frames. The longitudinal framing system is very light, the sides of the boat being obviously depended on for longitudinal strength.

Boat bottoms are either hollow or flat at the step, with a flare upward. Large boats have two steps and small boats one step.

The S. A. I. A. firm have departed from conventional design in a large double-hulled flying boat (S–55) with short boat hulls having the tail supported by booms. The unbraced monoplane wing is wood, plywood covered, following Fokker practice. This machine must be both expensive to build; very difficult to ship, and of doubtful life if exposed to the weather. Its sole apparent advantage is the elimination of wing floats, but the price paid for the gain seems to be excessive.

No metal boat hulls have been constructed. One is contemplated as an experiment.

Metal construction of land planes in quantity production is under way with the *Deroitine*, built of duralmin from French plans. These are being built by the Ansaldo Co. This company has also designed and built one all-metal observation monoplane (Fiat A-20 engine). This one experimental plane is now ready for official trials.

At Fiat a steel-framed fabric-covered single-seater has been started. This will have a steel-tube fuselage (fabric covered), steel wing beams, and duralmin plate ribs, fabric covered. The wings are made of two U-shaped channels bent out of steel plate with flanged lightening holes. Two such channels are rivited together, the legs of the channels making a double flange for the box-shaped wing beam. This construction looks cheap but is somewhat heavy.

In conversation with the engineer in chief of the Air Ministry it was learned that the principal reason why pontoon seaplanes are not in use in Italy is that the Italian builders have developed and offered to the Air Ministry only the flying-boat types. The engineer in chief thought that the American twin-float type is superior for speed and control, although perhaps inferior on the water. The Schneider race gave them something to think about. The Italian engineers seemed interested in our central-float types (Vought), however, and favor the construction and trials of the Piaggio design along these lines for a new single-seater seaplane fighter.

The Italians are not displaying any zeal for antistall devices nor means to improve speed range or control at low speeds. As they have no aircraft-carrier development in hand, it is no doubt natural that such questions do not strike them as vital.

New observation seaplane "S–59"

It has been ascertained from a reliable source that the Savoia Co., well-known Italian seaplane designers and constructors, have just completed the modification of the *S 16* ter observation seaplane. The new machine will be designated as the *S–59*. It is equipped with a 500-horsepower Asso engine, built by Isotta Fraschini. The principal structural differences between the *S–16* ter and the *S–59* is that the boat hull has been enlarged and the bottom, in particular, widened toward the bow. Characteristics of this modified seaplane are not yet available.

The Savoia Co. intends submitting this machine to a very severe test before offering it to the engineering division. It is intended to make actual flying tests totaling about 150 hours. This flight testing will also be an excellent test for the Asso engine, which, although reported very satisfactory, has not yet undergone severe service trials in endurance flying.

Air squadrons assigned to navy

It has been ascertained from reliable source that at the present time the squadrons actually assigned to the navy are as follows:

Observation squadrons (VOs)	13
Fighting squadrons (VFs)	6
Total	19

It is to be noted, however, that the squadrons assigned to the navy are under the direction of the navy for employment only, and that

the Air Ministry has jurisdiction over them in matters pertaining to equipment, training, promotion, etc., as per royal decree.

While regulations concerning seaplane squadrons assigned to the navy are being studied and discussed between the Air Ministry and the Ministry of Marine, it has been decided that for the present at least the following seaplanes will be embarked on board the ships listed hereunder in an experimental way:

Battleships	Seaplanes
Cavour	1 M–18 observation seaplane, folding wings.
Doria	1 M–18 observation seaplane, folding wings.
Cesare	1 M–18 observation seaplane, folding wings.
Dante	1 M–18 observation seaplane, folding wings.
Duilio	1 M–18 observation seaplane, folding wings.
Destroyers	
Ancona	1 M–7 ter pursuit seaplane, folding wings.
Taranto	1 M–7 ter pursuit seaplane, folding wings.
Marsala	1 M–7 ter pursuit seaplane, folding wings.
Quarto	1 M–7 ter pursuit seaplane, folding wings.

To each seaplane is assigned a crew of three men of the air service, viz: One pilot, one motorist, and one rigger.

In case observation seaplanes are assigned to battleships the observer will be a navy officer, duly instructed.

For the time being and until a definite arrangement of the seaplanes on board the ships has been decided upon the machines will be embarked during periods of maneuvers or during special missions. Otherwise the seaplanes will be stationed at the bases of Spezia, Taranto, and Naples, where pilots and observers will fly the prescribed number of hours every month in order to be fully efficient at any required moment. No catapults are being installed at present, so the planes will be hoisted out and in.

JAPAN

NAVAL NOTES

Cruiser "Furutaka" delivered

The *Furutaka* (7,100 tons) was delivered to the Japanese Navy on March 31, 1926. She will leave Nagasaki on April 8 and sail to Yokosuka via Sasebo. The commanding officer will be Capt. K. Shiozawa.

Submarine launchings

Submarine I–21 (1,000 tons, mine layer) was launched at the Kawasaki Dockyard, Kobe, on March 30, 1926.

Submarine I–54 (1,400 tons) was launched at the Sasebo Navy Yard on March 15, 1926.

Submarine Ro–67 (998 tons), building at the Mitsubishi Dockyard, Kobe, was launched on March 18, 1926.

Submarine periscopes

It is reliably reported that patents have been granted in Japan for two types of German submarine periscopes. One of these is the Goerz type, referred to as "periscope a oculaire fixie (standsehorhr) brevete," which is provided in lengths from 6.2 meters to 15 meters maximum. The other periscope is known as Humbrecht (Doctor Konig—Fernrohre und Enefernungamesser) and is built to the same design principles as the Goerz type above. The Goerz type above is not used in Japanese submarines and is criticized by the Japanese naval people as being too heavy and as having unreliable and unsatisfactory housing apparatus. It is not known whether or not the Humbrecht periscope is used by the Japanese Navy.

Replacement program

A reliable informant has stated as his opinion that the Japanese naval replacement program will consist of 4 10,000-ton cruisers, 20 destroyers of about 2,000 tons each, 5 submarines of about 2,500 tons each, 1 repair ship, 1 tanker, 1 aircraft carrier, and 3 gunboats.

The yearly allotment of funds for the construction of the above ships is to be as follows:

1926–27	¥8,000,000
1927–28	28,000,000
1928–29	50,000,000
1929–30	120,000,000
1930–31	120,000,000
Total	326,000,000

Purchase of autofrettage system of manufacture

In 1924 the Japanese Army and Navy purchased from the French Creusot Co. the license to manufacture guns by the "autofrettage"

system, paying for it 2,600,000 francs. A mission was sent to France at that time to learn the details of manufacture.

In addition, the army purchased 1,113,000 francs worth of spare parts for the 75-millimeter gun, 105-millimeter gun, and 150-millimeter howitzer for delivery in March, 1925. Autofrettage material to the value of 300,000 francs was also purchased.

The navy purchased 2,225,000 francs worth of spare parts for the 200 millimeter gun for delivery in July, 1925, and March, 1926, and autofrettage materials to the value of 300,000 francs.

The total value of the army and navy purchases at that time was 6,500,000 francs.

Maidzuru Naval Station

Importance.—This naval station may still be regarded as a first-class navy yard, at least in equipment. In order to keep a large force of trained workmen available, a considerable amount of work is done by this yard for Kure Naval Station.

Mobile defenses afloat.—Armored cruiser *Nisshin*, ninth destroyer division; *Kuwa*, *Keyaki*, *Maki*, and *Tsubaki*.

Land available for necessary building and equipment.—Drill field of about 2½ acres could be used for building purposes.

Personnel attached to base.—Vice Admiral Furuzawa (commander in chief); 100 enlisted men attached to station; 2,000 enlisted men (recruits) belonging to Yokosuka Navy Yard in temporary quarters awaiting repair of barracks at Yokosuka; 600 enlisted men (recruits) undergoing training at Maidzuru Naval Station. Engineering school personnel: One engineer captain, 1 engineer commander, 20 engineer officer instructors, 10 civilian instructors, 120 engineer cadet students, and 16 engineer warrant officer students.

Navy-yard employees and labor market in vicinity.—The source of supply for employees are the towns of Shin-Maidzuru and Naka-Maidzuru. Very few laborers live in the near-by town of Maidzuru, although this latter place could be drawn upon for labor supply. At the present time 3,500 laborers are employed at the navy yard.

Vessels building at yard.—Destroyer *No. 31*, 1,445 tons displacement. Statement made that this destroyer would be launched in May, 1926. One 300-ton tug to be built upon completion of above destroyer.

Cranes, floating and fixed.—Two floating cranes of 70 tons capacity and 2 fixed cranes of 35 tons capacity.

Oil-storage facilities and amounts on hand.—Only two 55,000-barrel oil tanks seen. These were painted green. Statement made that only a small amount of oil kept on hand.

Dry docks, including floating.—Only three docks were seen. The escorting officers stated that there are only three docks at this yard. The largest dock is capable of holding a battleship of the largest size. Estimated dimensions, 1,000 by 120 feet.

Hospital facilities and sanitary conditions.—Half of the hospital buildings are now being used for housing the engineering school. The buildings are of wooden construction and very untidy in appearance.

Radio.—Three radio stations located as per sketch. Towers are of steel framework construction, painted gray. Single tower located near main office estimated to be 250 feet high.

Coal storage.—No storage sheds seen. Only one small coal pile located near power station.

NOTES.—Foundry, pattern shop, boiler shop, machine shop, and blacksmith shop were inspected and noted to be working at full capacity.

Permission was refused to see the molding loft, a machine shop, and the building ways.

Four express type destroyer boilers were seen under construction.

The existence of dry dock No. 4 (as shown in monograph sketch) is doubted, since this portion of the station consists of a narrow peninsula, with hills apparently extending to the beach.

Fujinagata Dockyard, Osaka

Location.—Southern water front of Osaka near the mouth of the Kitsugawa.

Importance.—This plant is a branch of the main steelworks located on the same river a mile upstream on the opposite bank. Three destroyers can be built at the same time and has sufficient capacity to build a modern light cruiser.

Personnel.—Superintendent of the yard is a retired captain of the navy. One naval inspector (commander), 2 civilian naval inspectors, 5 civilian assistant inspectors, and 1,200 civilian workmen.

Vessels under construction.—Destroyer *No. 29* (1,445 tons); expected date of completion, latter part of April, 1926. Keel blocks have just been laid for a second destroyer, number unknown.

Buildings and equipment.—Three building ways. Two traveling cranes and one stationary crane at building ways. All shops seen are very well equipped, but buildings in general are in a dilapidated condition. One new building is under construction.

Depth of river at present was stated to be 15 feet, but plans are under way to deepen the channel.

It was stated that all parts for the destroyer under construction were manufactured here except engines, guns, and other ordnance equipment.

Torpedo factories

The Mitsubishi torpedo factory at Nagasaki in equipment and factory methods is modeled after the Whitehead torpedo factory at Fiume, Italy. The principal output is the 533-millimeter modified Whitehead torpedo. All parts of this torpedo are manufactured at this factory except the air flask, which is obtained from Muroran Steel Works. Present output is 300 torpedoes of above type a year. The informant gave as his opinion that this factory was a first-class establishment in every respect.

All employees are civilians and number 2,100, of which 2,000 are shopworkers, laborers, etc., and 100 are administrative, executive, and other office workers.

Torpedoes are tested at Sasebo under navy supervision.

Kure torpedo factory is mainly engaged in experimental work and in production of smaller-size torpedoes (18-inch).

At the Kure factory experimental work is being done with a 587-millimeter modified Whitehead torpedo.

Number of enlisted men to be accepted for aviation training during fiscal year 1926–27

The following number of enlisted men will be accepted for aviation training at the Kasumigaura Naval Air Station during the fiscal year 1926–27 (April 1, 1926, to March 31, 1927):

Pilots' course (to be accepted latter part of August, 1926)	32
Pilots' course (to be accepted latter part of February, 1927)	32
Total	64
Observation course (to be accepted latter part of August, 1926)	20
Observation course (to be accepted latter part of February, 1927)	20
Total	40
Balloon and dirigible course (to be accepted early part of December, 1926)	6
Advanced course aeronautical engineering (to be accepted latter part of May, 1926)	30
Advanced course aeronautical engineering (to be accepted early part of December, 1926)	30
Total	60

Ordinary course aeronautical engineering:	
Plane (early part of September, 1926)	58
Engine (early part of September, 1926)	46
Ordnance (early part of September, 1926)	8
Photography (early part of September, 1926)	8
Plane (early part of December, 1926)	58
Engine (early part of December, 1926)	46
Ordnance (early part of December, 1926)	8
Photography (early part of December, 1926)	8
Total	240

NOTE.—

Duration of courses:		
Pilots' course	months	9
Observation course	do	9
Balloons and dirigibles	year	1
Ordinary course in aeronautical engineering	months	9
Advanced course in aeronautical engineering	do	6

Balloon and dirigible course is at Oppama Naval Air Station.

Appointments to naval schools

The number of Japanese naval cadets who have been appointed midshipmen from March 31, 1926, are as follows: Line, 68; engineer, 25; and paymaster, 12.

Ninety-six men completed mechanics course

The Official Gazette shows that 96 petty officers and men completed the airplane engineering course for enlisted men (ordinary course) at Kasumigaura Naval Air Station on February 25, 1926. Duration of course, nine months.

JAPAN

MISCELLANEOUS NOTES

Japanese activities in Lower California

Early in March, 1926 the Mexican government of Lower California revoked all Japanese fishing concessions and made drastic changes regarding the administration of future fishing operations on the banks of the lower coast. Prior to this action the Japanese had a virtual monopoly on the Lower California fresh fish, lobster, and abalone trade, as they paid $10 per ton less duty than did fishermen of other nationalities.

For several years a Japanese syndicate has been operating under a concession awarded by the Department of Fomento of Mexico

City, with virtual exclusive fishing rights from Todos Santos Bay to Cape San Lucas, or along the entire Pacific Ocean front of the Lower California peninsula. For this concession the Japanese paid the Mexican government a straight tariff of $20 a ton for fish and a specified sum per ton for abalone, lobsters, and the right to engage in pearling.

Under the terms of the concession the Japanese were to build and operate two canneries, one to be located at Turtle Bay, the other on Cedros Island. The Mexican government claimed that the Japanese never made any attempt to fulfill this part of the contract, and when concerted protests were forwarded to Mexico City by local fisheries interests that American fishermen were being discriminated against by being forced to pay $30 a ton for fish compared to $20 by the Japanese the concessions were revoked. This action on the part of Mexico City played havoc with the plans of the Japanese to operate the large refrigerator steamers *Haruna Maru* and *Chichibu Maru* in the Lower California fisheries trade. The *Haruna Maru* was laid up alongside the Santa Fe wharf at San Diego, Calif., from the 1st of January until March 7, 1926. During this time it is understood her engines were completely overhauled. During this time the *Chichibu Maru* was laid up in Japan, awaiting developments.

Recently word has been received that all fishing rights on the Lower California coast have been restored to the Ocean Fisheries Co., a Japanese syndicate, headed by M. Kondo.

Kondo's concession, along with 20 others, was abrogated by the Mexican Department of Fisheries in March, following a decision to abolish all special privileges in the fisheries industry off the Lower California coast. In resuming operations the Japs must now pay $30 a ton tariff, the same as the Americans.

Kondo has chartered the motor ships *Huntress* and *Vaquera* to replace the Japanese refrigerating steamers *Haruna Maru* and *Chichibu Maru* in the lower coast trade. The *Huntress* sailed for Cape San Lucas recently with 20 Japanese fishermen, who arrived at Los Angeles harbor on the *Ginyo Maru* a few days prior.

Military training of youths

[Source, M. I. D.]

In connection with information given in June, 1925, BULLETIN, the following is of interest:

One of the most important events that has taken place in Japan in recent years is the institution of military training of youths, not only those who are enrolled in schools but extended to include those

who are not so fortunate as to have the advantage of higher intellectual education.

The military training recently made compulsory for all youths in middle schools and universities under the jurisdiction of the Department of Education is modeled along the general lines of our own R. O. T. C. system. The original act provided that training in normal schools, all Government and private middle schools, Government and private technical schools, high schools, preparatory schools, and colleges should be obligatory.

In all, there are 1,164 schools where military training is given, and, to date, all but 30 of these schools have been provided with active army officers as instructors. The total number of students now undergoing military training may be taken as 475,000.

The instructor personnel are selected from the active army list from the grade of first lieutenant to colonel. On December 2, 1925, officers were detailed on this duty as follows: Colonels, 20; lieutenant colonels, 47; majors, 241; captains, 682; lieutenants, 124; total, 1,114. In addition there are a large number of reserve officers employed directly by the various schools.

The courses of training, schedules, etc., are decided upon by mutual arrangement between the War Department and the Department of Education. Two or three hours per week in the case of middle schools, and at least one and a half hours per week in the case of higher schools are devoted to training. Four to six days every year will be spent in field training.

Investigation having shown that a great mass of the young Japanese receive only elementary school education, it was then decided to extend military training to this class, estimated to number 1,500,000 annually. While this class of training is to be entirely voluntary, whoever refuses to enroll does so at the risk of remaining in conscriptional training for the full specified term.

This training, not in schools, is to consist of 800 hours during a four-year period, as follows: Ethics and citizenship, 100 hours; elementary education, 200 hours; business training, 100 hours; and military drill, 400 hours.

The undertaking, being entirely national, will be placed under the direction of the local mayor or village chief. The schoolmasters, usually military reservists, will act as instructors. The War Department is responsible for the supply of arms and other necessary equipment as well as the inspection of the results attained. As can readily be seen, it is, in a way, an adaptation of many of the features of our C. M. T. C. system.

Perhaps the army alone realizes the full significance of the new system. Military training is extended to 2,000,000 young men, the great majority of whom would not have received it otherwise,

thus increasing to a marked degree the efficiency of the Japanese Army. The national physique will be greatly improved, the army and navy will regain its old place in the affections of the people, and there will be a general get-together in national thought and ideas.

Undoubtedly the new system means a marked increase in Japan's military power, accomplished at a minimum of expense either to the nation or to the individual.

[From the Japanese press]

Discovery of oil

Prospecting for oil is energtically going on in the two northeastern Prefectures of Iwate and Miyagi and prospectors have come from all parts of Japan in the search for oil wells in those districts. No less than 113 applications have been filed with the Sendai Mining Control Bureau for prospecting an area of 54,000,000 tsubo. These applications are having the careful attention of the mining officials, who, in consultation with the prefectural authorities have granted permits in 21 cases. The area considered most hopeful is in the suburbs of Sendai, a stretch of land known as Nana Kitada. On this area a permit has been given to a Tokyo man who will start drilling shortly. The Department of Commerce is reported to attach great importance to the developments.

New wireless stations

The Honjo sending station (Honjo is a town about 4½ miles northwest of Kure) buildings are completed and the work of installing dynamos and other equipment is now going on. Work on the masts is now going on and it is expected that all work will be completed by the end of the fiscal year (March 31, 1926) and to be in working operation by May.

The old wireless station in back of the naval station will probably be left as it is.

The height of the masts for the new station is stated to be 300 feet.

The Iwatsuki wireless station has been completed and will be in operation from the early part of April, 1926. This station is to be used for communication between Japan proper and her colonies. (Iwatsuki is about 21 miles north of Tokyo, in Minami Saitama Prefecture, Province of Musashi.)

Kemigawa wireless station, built by the Department of Communications, has been completed. This is one of the most powerful stations in the Orient. It is equipped with three antenna towers 300 feet high and can send out wave lengths of from 5,000 to 10,000 meters. This station will be mainly used for communication to the colonies, such as Formosa, Korea, etc., and will be used as a relay station to the central station in Tokyo, together with the receiving station in Iwatsuki. (Kemigawa is in Chiba Prefecture, Province of Chiba, and about 19 miles southwest of Tokyo.)

The J.I.A.A., the largest radio receiving station in the Orient at Iwatsuki, held its opening ceremony on March 20. This station is one of the three units of the Tokyo Wireless Telegraph Office, the forwarding station at Kemigawa, opening on March 21, and the central forwarding station at Tokyo being the other two. The J.I.A.A. station is capable of directly communicating with stations at Otomari, Ochiishi, Ishikari, Kanazawa, Osaka, Kagoshima, Osesaki, Nawa, Keijo, Dairen, Keelung, Chickishima, Yap, and Parao. Forwarding messages from this station are relayed by the central station at Tokyo. For this purpose this station has five 50-kilowatt transmitters. All equipment in this station was designed and built in Japan and found satisfactory, proving that domestic radio equipment is equal to the imported article. The Buenos Aires station, 14,000 miles away, was the farthest station heard from on the opening day. Messages were also received from Nauen, Germany; Paris, London, Bagdad, Melbourne, New Zealand, New York, California, and others.

Aviation

Age of pilots of heavier-than-air craft.

	Navy	Army
Candidates for aviation pilots:	*Years*	*Years*
Upper age limit, officers	25	31
Lower age limit, officers	17	22
Upper age limit, enlisted men	25	26
Lower age limit, enlisted men	17	20
Average age of pilots:		
Officers and enlisted men combined	26	
Officers		30
Enlisted men		23
Average age of 10 oldest pilots:		
Officers and enlisted men combined	35	
Officers		35
Enlisted men		30
Upper age limit of aviation pilots:		
Active—		
Officers	37	48
Enlisted men	37	38
Reserve—		
Officers	37	49
Enlisted men	37	44

Japanese Army aviation force

From a reliable foreign source it has been learned that the Japanese Army aviation force, according to present plans, will be as follows by 1931:

	Squadrons	Personnel	
		Officers	Men
First Regiment, Kagamigahara	2 observation, 2 combat	60	700
Second Regiment, Kagamigahara	1 observation, 1 combat	40	363
Third Regiment, Yokkaichi	1 observation, 2 combat	46	530
Fourth Regiment, Tachiari	2 observation, 2 combat	60	700
Fifth Regiment, Tachikawa	2 observation, 2 combat	60	700
Sixth Regiment, Heijo	2 observation, 1 combat	48	530
Seventh Regiment, Hamamatsu	2 bombing, day, 2 bombing, night	70	700
Eighth Regiment, Tacnau (Formosa)	1 observation, 1 combat	45	398

NOTE.—Formosa detachment not definitely decided.
Observation squadron to have 12 planes.
Combat squadron to have 10 planes.

Personnel by 1931

	Pilots	Observation and gunnery	Ground, etc.	Total
Officers	300	225	200	725
Petty officers and men	150	125	4,200	4,475
Civil			1,950	1,950
Total	450	350	6,350	7,150

Flights to Saghalien and Ogasawarajima

The Imperial Flying Society is preparing to carry out long-distance flights between Tokyo and Saghalien and between Tokyo and Ogasawarajima in July. The Kawasaki Dockyard Co. will modify the petrol tank of their *Comet* machine so as to be able to make a continued flight of 13½ hours. The Nihon Koku Yuso Kenkyujo will also participate with a modified Hansa type, which is now under construction, and fitted with a 300-horsepower Hispano engine. In addition to the above companies the following will also take part: Nihon Koku Kabushiki Kaisha, Aichi Tokei Denki Kaisha, and Nakajima Hikoki Seisakujo. The Japanese Navy will guard the route between Tokyo and Ogaswarajima.

Aerial Maneuver in Kagoshima (Kyushu)

The ships of the first fleet are to leave Tokuyama, sailing down along the east coast of Kyushu and will arrive in Kagoshima Bay on March 18. The aviation corps of Sasebo and Omura will take advantage of this occasion to hold an aerial maneuver with the air force of the fleet over Kagoshima Bay.

Planes participating are as follows: Six from Hosho; 6 from Omura Station (battling planes, Mitsubishi No. 1 type); 3 from Sasebo Station (Hansa planes); and 3 from Sasebo Station (F–5.)

Japanese Navy Yokosuka-Omura flight

At 6 a. m. March 16 two navy torpedo planes (Mitsubishi No. 4 type) left Yokosuka on a flight to Omura. Stopping for fuel at Akenogahara (army flying field) and Hiroshima they arrived at Omura at 5.10 p. m. the same day, March 16. Total distance, 527 miles. At 7.25 a. m. on March 17, these two planes left Omura for the return flight. They arrived at Hiroshima at 9.15 a. m., fueled, and proceeded from there at 10 a. m. Time of arrival at Yokosuka not known. One purpose of the flight was to test the ability of communicating by radio between the planes and the radio stations at Yokosuka, Kure, and Sasebo and various units of the fleet under way and at anchor off Mitajiri.

Maneuvers of air forces stationed at Kasumigaura Naval Air Station

From March 12 to 15 aircraft maneuvers were held by the air forces stationed at the Kasumigaura Naval Air Station. The assumption was made than an aircraft carrier appeared off the Boso Peninsula and sent up its planes to make an air raid against the Kasumigaura Naval Air Station. Six Hansa seaplanes, with a constructive carrier, launched the attack from Tateyama Bay at 4.30 a. m. on the 15th during a fog. The defending aircraft made contact with the invading force over the Tone River, but was unable to drive them off. The attacking force succeeded in reaching their objective, and after dropping common and smoke screen bombs the action terminated at about 7.30 a. m. About 20 planes of different types participated.

Airplane depot at Kure

A large airplane depot which has been under construction at Kure has recently been completed and is to be used to store airplanes to supply ships of the fleet. The capacity is being kept secret but is said to be large enough to hold enough planes to supply not only the depot ships but also most of the ships of the fleet.

A giant hangar will soon be built at Kure Naval Station at a cost of ¥150,000. It will be of reinforced concrete, covering 600 tsubo, and will have the capacity to house 50 airplanes.

New commercial plane

A commercial plane built by Kawanishi Airplane Works, Kobe, was awarded a prize of ¥30,000 by the Aviation Bureau, Department of Communications.

The plane is a modified Kawanishi No. 7 type seaplane and can also be used as land plane. Lorraine 400-horsepower motor is used. It has an endurance of from 9 to 10 hours and, due to a special arrangement, is able to land in a small space. It is expected that this plane will eventually be used in the Osaka-Shanghai mail trip.

Airplane accident

While engaged in bombing practice at Kasumigaura Naval Air Station on March 25, 1926, two planes, 1924 type torpedo Mitsubishi No. 3, Napier Lion 450-horsepower motor, Nos. *R–331* and *R–328* had a collision at a height of 800 meters and both machines fell to the ground. The occupants of machine *R–331* were killed (one sub-lieutenant, second grade, and one petty officer), while the occupants of the other machine escaped with slight injuries. Both machines were badly damaged.

NETHERLANDS

GUNBOAT "FLORES"

April, 1926

Photograph shows Dutch gunboat (sloop) *Flores*, which is to be commissioned during the summer and proceed to the East Indies.

A sister ship, the *Soemba* will also be commissioned during the summer.

GUNBOAT (SLOOP) *FLORES (AND SOEMBA)*

NETHERLANDS

The gunboats (sloops) *Flores* and *Soemba* are building at Rotterdam. Displacement, 1,676 tons. Dimensions, 248 by 37½ by 11¾ feet. Guns, 3–5.9 inch, 1–3 inch, A. A. 2 M. G. Horsepower, 2,000= 15 knots. Complement, 132.

These vessels, which are intended for the defense of the mine fields at Soerabaya, have an armored deck and conning tower. They are to be fitted with Flettner rudders.

NETHERLANDS

THE AIR STATION AT SOERABAYA

January, 1926

[From a consular report]

Not long ago three members of the Stirling New Guinea expedition came to Soerabaya, which was sent out under the auspices of the Smithsonian Institution. It expects to visit certain unknown parts of New Guinea in an airplane. The three men who have arrived are all pilots who are fairly well known in American commercial aviation circles. These men desired a place in which to assemble their plane, so they were introduced to the commandant of the Dutch Navy at Soerabaya. A hangar in the naval flying field was immediately set aside for their use. They have been shown every imaginable courtesy and assistance and their reactions and observations appear worthy of record. They are well acquainted with American aviation fields (commercial, naval, and Army), so their comparisons with the Dutch field at Soerabaya should be of interest.

According to these pilots, they have never seen a better equipped aviation field anywhere than the one at Soerabaya. They estimated that the field here has 11 of the most modern types of seaplanes and were told that 21 new seaplanes are expected within a short time. Eighteen of the new planes will be the most modern types of the Fokker make and three will be large German all-metal Dorniers, each one equipped with two Rolls-Royce engines of 350 horsepower each. The field has four large hangars, each one of which is capable of housing 20 planes of the size of our Martin bombers. In each hangar there is a 10-ton overhead hoist which can travel the length of the building. All the wings, fuselages, and woodwork for the planes are made at the local field by expert Chinese carpenters.

At the present time there are approximately 12 seaplanes in use at the field, among which are 8 Fokker fighting planes; 2 large English Faireys of the most modern construction, each equipped with a 450-horsepower Napier engine; 1 large German all-metal

monoplane with a 450-horsepower engine; and 1 amphibian Fokker plane. There are 5 monoplanes in the hangars which are being assembled at the present time.

The hangars are all made of trussed steel with no overhead beams. They are all fireproof. Beside the hangars is a large deep harbor which has been built especially for launching the seaplanes. On the other side an army flying field about 1,000 yards square is being built for the army airplanes. It is said that the local authorities appealed to Batavia for permission to delay the work on the army field owing to the great difficulties to be overcome and as there appeared to be no urgent necessity for the field. They were informed that no delay would be permitted and that all possible haste should be made.

At the present time there are only 12 pilots at the local field, but more are expected in the near future. These 12 pilots do 30 hours of regular flying per month. According to the American visitors, this is far greater than in American fields.

PERU

NAVAL POLICY AND ORGANIZATION

April, 1926

[Source, O. N. I.]

Naval policy

Peru extends on the seacoast in a northwesterly direction 1,300 miles, with a breadth varying between 50 and 600 miles. The coast is generally straight and precipitous, all ports being open and unprotected, with one or two exceptions.

The country is rich in mineral and vegetable products. There are valuable oil fields located at Talara and Zorritos. Peru is not a self-sustained nation, and depends upon her maritime commerce for outside resources.

The present strength of the Peruvian navy may be called negligible, and the country is absolutely defenseless. The present economic condition of Peru does not permit her building up a strong navy; however, this is not considered absolutely essential to maintain her honor and prestige among the family of nations.

Prior to the arrival of the United States Naval Mission no definite naval policy had ever been formulated. The mission, after considering Peru's geographical position and economic condition, arrived at the conclusion that a defensive policy should be formulated to prevent an economic blockade from the sea and to be of such strength

as to be able to cut the enemy's line of communications in case of attack. With the above in view, the United States Naval Mission in December, 1923, proposed a building program, which was approved by the Minister of Marine and the President of the Republic, as follows: Six destroyers (U. S. S. *Chandler* class); 6 submarines (improved "R" type, United States Navy); 25 seaplanes (training, Combat, and bombing); submarine and destroyer base and repair station; supply of torpedoes, mines, and depth bombs; and purchase of new ammunition for above units and to replace old ammunition now in stock.

The Peruvian National Congress on January 11, 1924, passed an act creating a "National defense fund" (to be supported by certain additional taxes to be levied), the proceeds of which are to be used in new acquisitions for the army and navy. The Government made an effort to float a loan based upon the above "fund" in order to carry out half of the navy program noted above. The loan was nearly consummated when complications instituted by the Guaranty Trust Co. upset the transaction. Subsequently a contract was entered into with the Electric Boat Co. for 2 submarines, 24 torpedoes, and a complete submarine station (including electric plant, repair shop, and marine railway capable of lifting a boat of 1,500 tons), for the sum of $3,150,000.

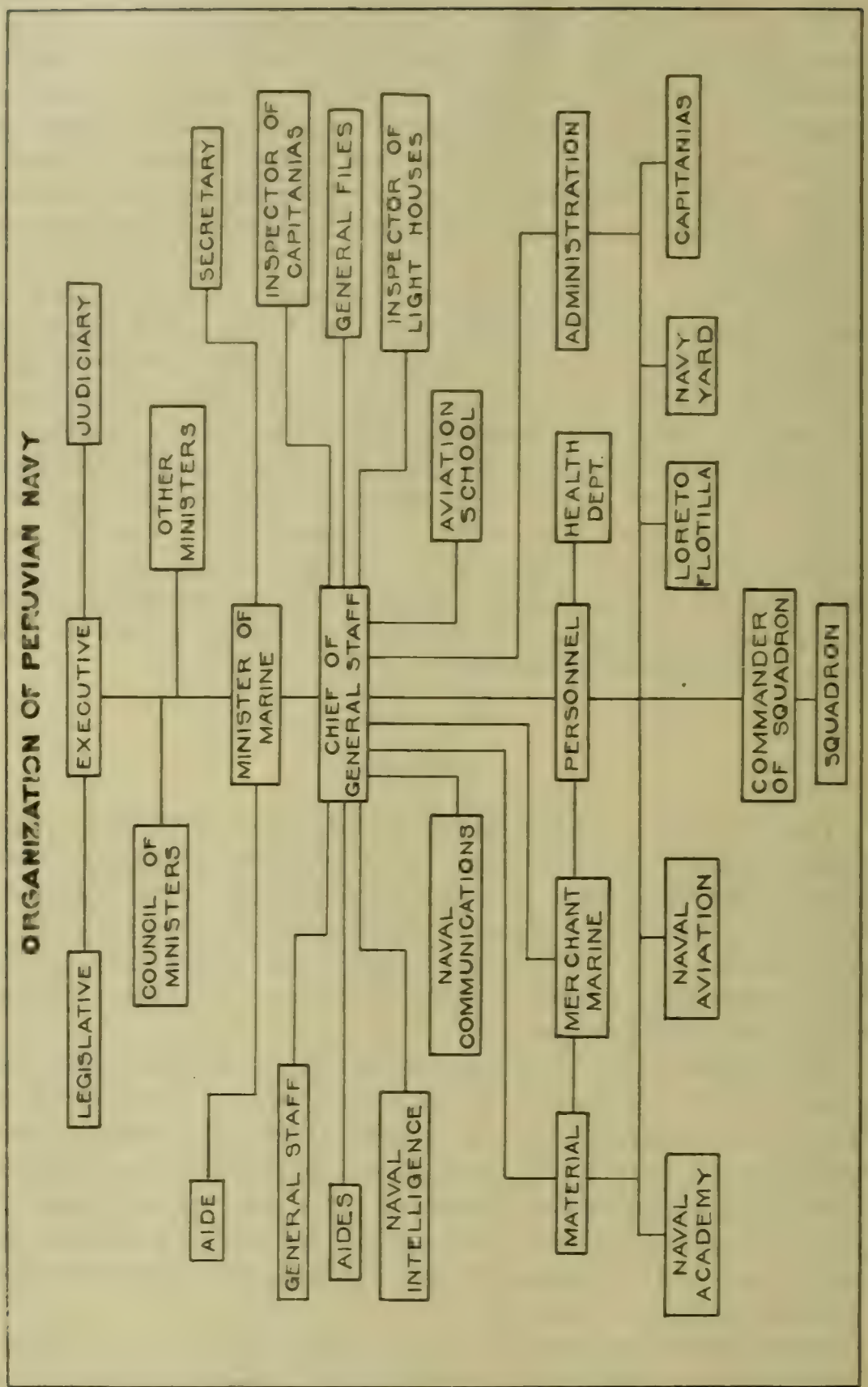
Organization

The President of the Republic is commander in chief of the public forces. The Minister of Marine is the titular head of the navy. The chief of the Naval General Staff, which post at present is held by the head of the United States Naval Mission, who has the rank of rear admiral in the Peruvian Navy, is the actual head of the navy and immediate advisor of the minister on all matters relating to the naval establishment.

The General Staff, in addition to its chief, consists of four other officers of the United States Naval Mission and one Peruvian officer. They have supervision over all matters concerning naval preparation for war; organization, training and operation of fleet; preparation and promulgation of all general and special orders; inspection of ships and shore stations; preparation and readiness of plans for use in war; and preparation of codes, signals, and other methods of communication.

The squadron is commanded by an officer of the Naval Mission, who has a commander as his chief of staff, and three other aids.

The only base which the navy possesses is located at San Lorenzo Island (4 miles from Callao), which is now under construction and


ORGANIZATION OF PERUVIAN NAVY
LEGISLATIVE
EXECUTIVE
JUDICIARY
COUNCIL OF MINISTERS
OTHER MINISTERS
SECRETARY
MINISTER OF MARINE
INSPECTOR OF CAPITANIAS
GENERAL FILES
INSPECTOR OF LIGHT HOUSES
CHIEF OF GENERAL STAFF
AVIATION SCHOOL
ADMINISTRATION
CAPITANIAS
NAVY YARD
HEALTH DEPT.
LORETO FLOTILLA
PERSONNEL
COMMANDER OF SQUADRON
SQUADRON
AIDE
GENERAL STAFF
AIDES
NAVAL INTELLIGENCE
NAVAL COMMUNICATIONS
MERCHANT MARINE
NAVAL AVIATION
MATERIAL
NAVAL ACADEMY

expected to be completed by June 1, 1926. The base was built primarily for the two submarines now under construction in the United States. Its equipment is sufficient to care for the ordinary repairs of the squadron. This base is under the command of a commander, who has eight officer assistants.

There are no naval districts, as the term is generally understood in the United States Navy. The seacoast, lake, and river districts, however, are divided into "capitanias," under the direction of naval officers, who have jurisdiction over all maritime industries and merchant marine activities in the ports to which assigned.

Coast defenses.—The only coast defense in Peru is located near Callao. North of the mouth of the Rimac River there are two batteries—one consisting of four 6-inch Armstrong vavasseur (naval) guns, known as Alfonso Ugarti battery, and the other of three 9-inch Schneider canets in La Espirar battery. There is a small artillery garrison located at Mollendo. The coast defenses are under the jurisdiction of the War Department.

Naval aviation.—Peru has only one naval aviation station at present, located at Ancon, about 22 miles north of Callao. The equipment and buildings of this station are up to date. The present equipment is as follows: Three B. N–1 (type J–4 engines) training planes; five H–S–2–LS single-engine flying boats; two Curtiss seagulls; and two Douglas bombing planes (ordered), expected to be delivered May 15, 1926.

The navy does not possess any army planes.

About 15 officers are undergoing instruction in flying.

Strength

a. Personnel.—On the active list of the navy there are 133 line officers and 38 staff officers (32 engineers and 6 medical corps). The authorized strength of the enlisted personnel of the navy, beginning January 1, 1926, is 1,400. There are no reserves, auxiliaries, or marines, though the law authorizes the Government to use all personnel (officers and men) of the Peruvian merchant marine as reserve force in time of war or national emergency.

b. Ships.—Cruiser *Almirante Grau*, in commission, 3,200 tons, 24 knots, oil burner; cruiser *Coronel Bolognesi*, in commission, 3,200 tons, 24 knots, oil burner; gunboat *Lima* (old transport), in commission, 1,800 tons, 12 knots, coal burner; destroyer *Teniente Rodriguez*, in commission, 500 tons, 24 knots, coal burner.

In addition to the above there are now building in the United States two submarines of the "R" type, which are expected to be ready for service by July, 1926.

Loreto Flotilla.—River gunboat *America*, 240 tons, 12 knots; river gunboat *Napo*, 95 tons, 13 knots; river gunboat *Iquitos*, 38 tons, 7 knots; river gunboat *Cahuapanas*, 22 tons, 6 knots.

Distribution

The squadron is ordinarily stationed off Callao.

The Loreto flotilla is located in the Amazon River district, with headquarters at Iquitos.

Efficiency

The discipline of the Peruvian Navy may be considered at a low standard in comparison with our own service. The officers and men appear to be ready and willing to obey orders, so long as the superior set over them is present to direct and guide them; otherwise they lack the sense of responsibility.

Only simple maneuvers have been undertaken by surface ships to date. Target practice under what might be called "modern conditions" was not known in the Peruvian Navy previous to March, 1924. The target practice for 1926 indicates improvement in both the interest and execution on the part of the personnel.

Merchant marine

	Number of vessels	Gross tonnage
Steamers and motor ships 100 tons and upward	22	58,529
Sailing vessels 100 tons and upward	17	17,194
Total	39	75,723
Vessels less than 12 knots	34	51,806
Vessels 12 to 16 knots	4	20,612
Vessels 17 to 20 knots	1	3,305
	39	75,723

RUSSIA

MILITARY AND POLITICAL CONDITIONS

The Moscow conference of the Communistic Party passed a resolution of the reenforcement of the Red Army and fleet, which was prompted by Rykow's detailed statement of the present numerical strength of the European capitalistic armies. After indulging in violent attacks against the League of Nations, Rykow said that—thanks to Locarno—England had become the dictator of the league

and Germany the instrument of England. A free foreign policy was owned by two countries only, namely, England and Russia.

The Council for Labor and Defense proposes to collect material for the development and modernizing of war industry, and has intrusted the matter to Commissar Trotzky.

Official soviet circles are much disturbed by the signs of dissatisfaction in the Red Army. On the day of the Red anniversary at Moscow the military parade was canceled and the garrison disarmed, only one rifle being allowed for each company (250 men). In the military department of Odessa the chief of the divisional staff, four regimental commanders, and a number of commanding officers have been discharged for not having suppressed the disorders in the army. Anticommunistic riots occurred in Kiev in November, in which soldiers of the Red Guard took part. Severe orders have been sent to the Tscheka at Minsk. The "Asiatic East-European Service" reports that General Bogdanitzky, chief of the military department of Turkestan, was shot by order of the soviets on December 16, together with his wife and aid-de-camp. Bogdanitzky was accused of entertaining treasonable connections with the generals of the White Army and with the Russian emigrants abroad.

The American Senate decided to abstain from passing a resolution on Senator Borah's application for a recognition of the soviets.

The chief commander of the naval forces of the Soviet Union, Soff, informed foreign press correspondents that the maneuvers of the Baltic fleet had furnished ample proof of the ability of the Russian Navy to defend Petersburg against any aggression. Soff called attention to the necessity of modernizing the fleet. Seaplanes, minelayers, and submarines took part in the Baltic maneuvers, whose general tendency was governed by the apprehensions called forth by the Anglo-Russian tension, the soviets being firmly persuaded that Petersburg would be the first object of a British attack.

In order to consolidate the connection with China, the Soviet Government proposes to establish an air communication from Verchny Udinsk in south Siberia to Peking, via Urga, the capital of Mongolia. The flight would take 16 hours. It is said that the plan meets with approval in China.

Situation in the Red Fleet

[Source, M. I. D.]

It is reported that a naval soviet marine mission arrived in Italy in February with a former professor of the old Russian Naval Academy as its chief. This mission has been sent to order the construction of a number of torpedo-boat destroyers of the same type as the Italian service boats which were last year at Petrograd.

The informant had Russian friends and made the acquaintance of certain members of this mission. He was able to establish friendly relations with a couple of the members of the commission who had formerly served in the Imperial Russian Navy and from them he learned certain particulars as to the condition, etc., of the Red Fleet. The Soviet Government is extremely anxious to hasten the finishing of 9 submarines and 15 large high-speed motor boats for use against submarines. These high-powered motor boats are designed for the defense of Petrograd and have already been constructed at this place, the material of which they are constructed being received from Germany. The submarines will be about 1,300 tons and of the same type that Germany formerly constructed during the last part of the war. They will not have a large radius of action, but they are designed for local use in the Gulf of Finland and harbor defense. The construction of most of the parts intended for these submarines were made in the Obukhovo works and the assemblages made in the Neveskie works. The construction of the swift motor boats was commenced in 1925 in the Krosnie Sudotroetel works (the Red shipbuilders' works). The swift motor boats have been constructed as of the same type as the English models and have a speed of 40 knots.

The informant learned that the fleet in the Baltic, according to what they knew, was in a pretty bad shape. The reorganization of this fleet, which had been commenced by the Soviet Government some time ago, had ended in a complete fiasco. The sailors of this fleet had amongst them some of the ringleaders of the coup d' état of 1918 in the Bolshevist revolution and these men had become a sort of a Red aristocracy. An impossible situation seems to have grown up. No work is carried on on the ships. There is a great deal of drinking and practically no discipline. The women of the town visit the ships and the sailors come and go as they wish. The situation is impossible for the officers. Some time ago a delegation from the Baltic Fleet went to Moscow to protest aganst the general policy of the soviets. The sailors were extremely discontented with the Government for having entered into relation with foreign powers and also were extremely opposed to the new economic policy. The sailors and crews of these large ships are radical in their views and are now opposed to all the present soviet policies. In the Ministry of War and Marine the question of liquidation of the big ships of the fleet is freely discussed on account of this situation, but a decision has not been arrived at, as everybody is afraid to handle the question. Should anything offend the crews of these ships they are quite capable of laying alongside and blowing Petrograd off the earth with their guns. On the smaller ships conditions are better, but the Baltic Fleet, in general has practically no value as a battle unit. Some of the ships are of modern type.

In comparison with the Baltic Fleet the personnel of the Black Sea Fleet is much superior, but the material and ships are not equal to the Baltic Fleet. Practically all the good ships left with Wrangel and the material of the Black Sea Fleet now is negligible. While the foregoing facts may not be of great interest, they are certainly interesting from the fact that they came from an officer of the Red Fleet at this moment in Europe and may be depended upon as giving a pretty good idea of the Russian naval situation in the Baltic.

SPAIN

FOUR-YEAR CONSTRUCTION PROGRAM

A royal decree was issued on April 1, 1926, the main points of which are as follows:

a. The Minister of Marine is authorized to contract with the Sociedad Espanola de Construccion Naval for the construction at El Ferrol of a cruiser of the type *Principe Alfonso* and *Almirante Cervera* (7,850 tons), maximum cost, 61,000,000 pesetas.

b. The Minister of Marine is also authorized to contract with the same company for the construction of three destroyers, flotilla leaders, type *Churruca* (1,650 tons), to be built at Cartagena. Total cost of the three estimated at 49,380,000 pesetas.

c. The above-named naval constructions are to be undertaken at once and completed in four years, and their total cost, 110,380,000 pesetas, will be included in the budget of the Ministry of Marine as follows: Budget 1926–27, 28,000,000 pesetas; budget 1927–28, 30,000,000 pesetas; budget 1928–29, 30,000,000 pesetas; budget 1929–30, 22,380,000 pesetas.

SWEDEN

ACTIVITIES AT JUNKERS AIRCRAFT PLANT

The following information was obtained from a fairly reliable source concerning the plant of the Junkers Airplane Construction Co. at Limhamn in Sweden, near Malmö.

The director, Captain Florman, is a Swede; the manager is German, four shop foremen are German, and the rest are Swedes. The capital is all Swedish. At present they are building or assembling a military-type airplane. The *G–23–L–OR–2*, which is similar to their *G–23* type commercial plane. They have the following orders: Six for Turkey, to be armed with 5 Vickers guns, and 9 for Chile, to be armed with 5 Madsen guns. The planes have a wing spread of 41 meters and are to be furnished with three Junkers motors of 300 horsepower each. There are two stations on top of the body for guns and a gun platform underneath the body which can be with-

drawn or lowered in telescope fashion. This lower platform holds one gun and each of the upper platforms two guns.

At present 460 men are employed at the plant, but the manager expects to extend this to 1,200 men and also expects to build about 40 planes this year.

According to a press report, 80 scouting planes have been ordered by Turkey, but this is thought to be exaggerated on account of the capacity of the plant being limited to only 40 planes per year.

UNITED STATES

COMPARISON COMPLEMENTS, AMERICAN AND BRITISH COMBATANT SHIPS

[Source, O. N. I.]

American battleships' complements are greater than British complements for the following reasons:

(*a*) Our term of enlistment is 4 years, whereas the British term is 12 years. This results in a greater turnover in personnel for us, necessitating more training. Our recruits are sent to the battleships, which serve as training centers. These centers supply men who have become experienced to our smaller craft, where each man has more individual responsibility and must be efficient. Thus the complement of our battleships is largely made up of green youngsters. Naturally, it takes more men to man a ship under these conditions. Additionally, a portion of the crew may be considered in training and not largely effective in contributing to the efficiency of the ship. Actually we have 39 men on each battleship in training for destroyer duty.

The British, with their long-term men and small turnover, can man their battleships with a smaller complement of seasoned personnel, nearly every man being a specialist in his particular duties.

(*b*) Our policy is to make our ships self-sustaining as regard upkeep and repairs, work to be done by the ship's force. This requires more men on our battleships. At present we have our full crew aboard during overhaul period, as they perform a large portion of the work. The British rely on dockyards largely for upkeep and repairs. For example, during the World War at Rosyth usually there were a British battleship and destroyer in dry dock for repairs and another ship of each type standing by to take their places. The crews of these ships were away on two weeks' leave, the navy yard performing all the work.

(*c*) Our policy is to keep ships fully supplied with stores ready for long-distance operations. This requires a more elaborate accounting and storekeeping system, and consequently more men. British rely largely on near-by bases in the vicinity of operations for storing

arrangements. Example: When our first destroyers in the World War crossed the Atlantic and reported for duty at Queenstown, Ireland, they required nothing in the way of stores before commencing operations.

(*d*) Our fire-control system requires more men than the British system.

(*e*) On each of our capital ships there are three planes with launching devices, whereas the British have none. This requires more men for us.

In our light cruisers and destroyers, which are not called upon to perform extensive training duties, where the fire-control and storekeeping arrangements call for relatively fewer personnel, we require less men than the British. In our submarines we require about the same number of men.

Figures are available showing that on October, 1925, there were 13,363 officers and enlisted men, not including marines, assigned to the 18 battleships of the British Navy. Of these 18 ships, one was paid off indefinitely for refit and without a crew aboard, four were in reserve with one-tenth of their crews abroad. This in effect amounts to manning 13 ships for active service and 4 ships in reserve, or $13\frac{4}{10}$ ships as far as crews are concerned.

Dividing 13,363 by 13.4 gives 989 officers and men per ship. Adding approximately 167 marines, officers and men, gives 1,156 effectives per ship.

Similarly on January 1, 1926, there were 18,202 enlisted men, not including marines, assigned to our 18 battleships. Of these 18 ships, 3 were in reserve for modernization with 25 per cent of their crews aboard. This in effect amounts to manning 15 ships for active service and 3 ships in reserve, or $15\frac{3}{4}$ ships as far as crews are concerned. Dividing 18,202 men by 15.75 gives 1,155 enlisted men per ship. Adding approximately 79 marines of the enlisted force, gives 1,234 effectives per ship.

Considering the British battle cruisers, there were 3,552 officers and enlisted men, not including marines, assigned to the 4 battle cruisers. Of these 4 ships, 1 was paid off indefinitely for refit and without a crew aboard, 1 was operating as a gunnery firing ship with a special complement for this particular duty. This in effect amounts to manning 3 ships for active service. Dividing 3,552 by 3 gives 1,184 officers and men per ship. Adding approximately 147 marines, officers and men, gives 1,231 effectives per ship.

There is included in the complement of each of our battleships an average of 300 recruits, apprentice seamen of less than four months' service.

Our seasoned effectives are actually less than those of the British.

Numbers to man various types of ships, American and British, are shown below:

	Numbers
Battleships:	
American—	
Texas	1,312
Displacement, 27,000.	
Speed, 21.05.	
Horsepower, 28,373.	
Battery, ten 14-inch guns, sixteen 5-inch guns, eight 3-inch guns.	
British—	
Iron Duke	1,235
Displacement, 25,000.	
Speed, 21.00.	
Horsepower, 29,000.	
Battery, ten 13.5-inch guns, twelve 6-inch guns, two 3-inch guns, four 3-pounders.	
Light cruisers:	
American—*Richmond*—7,500 tons displacement	457
British—*Emerald*—7,550 tons displacement	577
Destroyers:	
American—*Selfridge*—1,215 tons displacement	113
British—*Wild Swan*—1,325 tons displacement	130
Submarines:	
American—*S–49*—993 tons displacement	44
British—*L–52*—960 tons displacement	42

UNITED STATES

AN ASPECT OF THE PACIFIC

By Lieut. C. B. Gary, U. S. N.

[NOTE.—This article was submitted in the United States Naval Institute Prize Essay Contest for 1926 and accepted by the board of control for publication in the Institute PROCEEDINGS, but, in deference to the department's wishes, the institute did not publish it.—ED.]

Motto: "The greatest victories are the victories of peace. The greatest battles are the battles which have never been fought."

Darrieus has observed that "Foreign policy and strategy are bound together with an indestructible link. Every naval project which takes account neither of the foreign relations of a great nation nor of the material limit fixed by its resources, rests upon a weak and unstable basis."

It is possible that, for our naval officers, there is a no more fruitful field of research and the subsequent application of facts deduced than in the study of the coordination of our naval effort with the currents and policies of our own and foreign peoples in their external affairs. This study includes not only political aspects of how peace may be honorably sustained or how, if war must come, it can be most intelligently prosecuted politically, but also how, in days of

peace, the Navy can assist in strengthening our international position against crises to which our avowed foreign policies might lead.

And it is the purpose of this essay to discuss a specific instance of the relations between our own and certain foreign nations, in the light of the opportunities which present themselves to our Navy for fortifying ourselves against the dangers toward which we might be gravitating in the Far East. And this specific case is: The importance to our Nation and Navy, of Russia, in the Pacific.

I

The Germans, of all the great non-Slavic nations, undoubtedly know the Russians the best and the Americans know them the least. This applies to the navies of these nations as well as to the bodies politic. With us, the reason for this is to be found in differences in individual character, social structure, language, and in geographical factors. Although we differ from the Russians in many respects, we have at least one great historical and national attribute in common. For the Russian is an explorer and colonizer by the land as the Anglo-Saxon is by the sea.

And when we consider that this Russian Empire grew in little more than two centuries from the small State of Novogorod and the Czardom of Muscovy to a territory extending from the Baltic to British Columbia and from the Arctic Seas to Persia and China; that this land possesses probably the greatest economic potentialities of any nation on the earth; that to-day she is our closest neighbor in the East, and that she is the only European State whose continental domains extend to the Pacific: when we study the significance of these facts we better appreciate her probable interest to us. And not only is Russia our closest neighbor in the East geographically, but ethnologically as well. By her expansion, she completed the white man's belt around the Northern Hemisphere and this white man now stands 40 miles across the Behring Straits, separating us from the yellow races. This, in itself, is a fact worthy of much consideration on our part. Is it possible that, in any question involving us in the east, this white man is not also concerned, and might it not behoove us to think of the direction which his interests will probably take?

Although our Nation and Navy know comparatively little of Russia and have had little cause, so far, to make Russia a subject for wide political and strategic study, yet the friendship between our two peoples has become almost proverbial. Russia's assistance to us in the most difficult period of our Civil War will never be forgotten, and later from her we obtained Alaska. In the last eight years, when dark days have fallen upon the Russian people, we have been their steadfast friend. We have rightly re-

fused to deal with the Bolshevist régime, but meanwhile we have firmly upheld the interests of the Russian people without interfering in their internal affairs. This, by the way, has been one of our few European policies which has remained constant throughout the last three administrations.

From the first revolution in 1917 until the famine of 1921 we energetically opposed every scheme of the powers which tended toward Russian dismemberment or the curtailment of the sovereignty of the Russian people on their own soil. And the scope of these remonstrances of ours on behalf of Russia extended all the way from Bessarabia to Sakhalin. Then we had a more concrete opportunity to express our friendship, in the form of the American Relief Administration in Russia during the famine days of 1921 and 1922. In this task we spent fifty millions of our money and, aside from the primary considerations of humanitarianism which prompted this work, these millions which we have thus expended have been a sound investment in the augmented friendship of the mass of Russia's people.

Among the most remarkable impressions which I have felt in Russia amidst the people and one of the few which can be clearly seen through the turmoil of Bolshevism is the feeling of friendliness, respect, and gratitude which exists toward America as a nation. I have found that this is the case wherever there are Russian citizens and (with the exception of the radical communists) whatever may be their individual political beliefs. They like us personally, they are sincerely thankful for our political and humanitarian assistance, and they trust us because they know that we have no desire to interfere in their internal affairs and no aims of territorial aggrandizement. Furthermore, we stand almost alone in this respect among the western powers.

Now in speaking of Russia to-day we must take care to differentiate between the Bolshevist government and the Russian people. The Bolshevists hate us, yet they want us. They hate us because we have not recognized them and because we oppose their revolutionary creeds. They want us because we could strenghten their economic position and our recognition would greatly enhance their prestige at home and abroad, and this without internal meddling. But the present régime in Russia, as a communistic machine, we may well nigh neglect when we are considering the national tendencies and aspirations of the Russian people. The history of the Bolshevist régime has well shown this by its continual conflict of communistic internationalism versus Russian nationalism. When Russian territory is not affected the Moscow Government loses its national character and appeals to all that is international and communistic. But when Russian territory and traditional Russian

policies are concerned the nationalism of Russia is too strong for the soviet and it has firmly upheld Russia's national interests, very cleverly, however, endeavoring to turn these to its own revolutionary ends.

Witness Russia's efforts for control of the Baltic, her attitude toward Poland, her constantly announced claim to Bessarabia, her minorities and economic policy in the Caucasus, her aggressiveness in the direction of Persia and Afghanistan, her rapid overwhelming of the abortive Far Eastern Republic, her policy in Mongolia and Manchuria, her struggle for Sakhalin, her recent quest for an ally in Europe after Germany had signed the Locarno pact—all purely Russian policies—nothing communistic about them. A crisis in Russian foreign affairs always shows the soviet falling back on traditional Russian policies where it knows it will be immediately supported by the Russia which is otherwise dormant. However, such constancy in the broad lines of foreign policies of Russia is characteristic of all nations, and this fact may be usefully employed in gauging the future actions of any particular State, regardless of the government of the day. Consul General DeWitt C. Poole has well expressed this in his book The Conduct of Foreign Relations Under Modern Democratic Conditions, as follows: "The main lines of foreign policies of nations seem frequently to be determined by the circumstances of their existence and reassert themselves in a surprising way under the greatest diversity of governments and personalities."

The government of the soviet (in its radical communistic form) is a transitory affliction, deceiving in its exterior, and if a reliable gauge of the real currents of Russia is to be found we must look behind and beyond Bolshevism to the great Russia which lives silently day to day but which is gradually emerging into its own. Russia is living, she is slowly coming back. The Russia of the future will be stronger and more stable for having passed through this fire. And it is there and then that we will find the crystallization of that friendship for America which to-day can not be visibly expressed. And this, be it remembered, from the Russia well planted on the Asiatic Continent, looking out on the Pacific, and our closest eastern neighbor. This deep sentiment of Russia in regard to us is a tremendous asset; its meaning for us may be more than we now realize, and we should foster it at every turn. The political and naval significance of this Russian attitude, coupled with the consideration of Russia's problem with Japan, forms the thought of this essay.

II

The history of Russian and Japanese contact in the Far East has been one of continual conflict. From the nature of conditions, it

could not be otherwise. The one desired a Pacific seaboard with at least one good ice-free port as an outlet for her vast Siberian hinterland; she required that her coast line be secure and well defended; that this coast be connected with the interior and with the mother country by a railway artery for purposes of defense as well as commercial and industrial development; that she have political as well as military protection on her southern flank; that Siberia become a Russian and not an oriental colony; and "that wherever the Russian flag is raised it must not be hauled down." The other desired the control, virtual, if not actual, of the Asiatic seas and coasts adjacent to Japan; the control of Sakhalin and the Kuriles; an Asiatic continental background, well secured in her favor; the control over the sources of supply of Asiatic raw materials which she so much needs; a territory, close at hand and favorable climatically, for her overflow population; and an Asia which exists for the Asiatics, one to which the white man of territorial aspirations is not welcome.

The Russians and the Japanese probably first met in the early years of the eighteenth century. Sakhalin, as has so often been the case since then, became the point of contention. No negotiations were held between these powers until 1866, when Sakhalin was discussed. This conference failed and subsequently the Japanese were driven out and obtained instead the Kuriles. But the beginning of the last decade of the nineteenth century marks the commencement of the more active and more resisted Russian *Drang nach Osten*, as it marks the beginning of the broad development in every way of the great Siberian empire, previously obtained for Russia by her adventurous explorers.

In 1891 construction was begun upon the trans-Siberian railway, which has proven to be one of the greatest factors in the history of the Far East since that date. Requiring 12 years to complete, $175,000,000 for the original single track line, it was destined to bind Petrograd with Vladivostok, 5,500 miles distant, and to prove of incalculable value to the Russian Empire, vitally influencing the history of Russia and her two wars which were to come. In 1895 the Russo-Chinese Bank was founded by Count Witte and supported by the Russian Government, its aim being the financing of Russian Far Eastern activities and the peaceful economic penetration of China and Manchuria. The Japanese countered with the Yokohama Specie Bank and began their intensive efforts for the economic control of central and southern Manchuria and the diverting of trade from the Russian border.

In 1896 Russia secured from China the valuable concession of a zone in Manchuria for the construction of the Manchurian section (the Chinese Eastern Railway) of the trans-Siberian line, which concession, of course, Japan regarded with no pleasure. That

Japan's attitude was considered apprehensive is indicated by the first article in the Russo-Chinese treaty of alliance of May, 1896: "The high contracting parties engage to support each other reciprocally by all their land and sea forces in case of any aggression directed by Japan against Russian territory in eastern Asia, China, or Korea."

In the meanwhile, the Japan-China War of 1894 had been fought and concluded by the treaty of Shimonoseki and Japan had obtained the Liao-tung Peninsula. But, two years later, it was chiefly Russia who forced Japan to return this to China, and in 1898, by the "Pavloff" treaty, Russia herself obtained Liao-tung from China on a 25-year lease. The end of the trans-Siberian trail was thus reached, and the Russian Bear looked out over the Yellow Sea from Port Arthur. The bitterness which this caused Japan can be well imagined. As Senator Ashurst has stated (Congressional Record, March 2, 1922), "By the trans-Siberian railway Russia stands squarely across the path of Japan." And quoting from Baron Korff, speaking of this period, "The Russo-Chinese Bank, the Chinese Eastern Railway, and the Siberian expansion all pointed, with unvarying clearness, but one way. Japan was bound to realize that sooner or later Russia would, in the Pacific, menace her fondest hopes."

In 1899 Japan's hold an Korea had become such that she encountered Russian opposition, while an offer made by the foreign office of Tokyo for a division of spheres of influence in Korea was rejected in Petrograd. In the next year, during the Boxer Rebellion, Russia further consolidated her position along the Chinese Eastern Railway and then it was Japan's turn to object. In 1902, fearing for her Far Eastern position in the face of such a powerful neighbor, Japan concluded with Great Britain the first of her Far Eastern alliance treaties. Baron Rosen, who, at the time, was Russian minister at Tokyo, has recorded in his interesting "Forty Years of Diplomacy" the continual clash of Russian and Japanese interests in the Far East which were particularly serious during these years. This constant struggle of opposing aims could not continue forever, and the result was the Russo-Japanese War of 1904–1905.

By the treaty of Portsmouth Russia lost the eastern terminus of her Siberian railway and Sakhalin south of the fiftieth parallel and Russian strength in south Manchuria disappeared while Japan's was correspondingly increased. The latter was further granted much-prized fishing rights along the Russian coasts in the Japan, Okhotsk, and Behring Seas.

Russia devoted the following years to strengthening herself north of Harbin and particularly in her own Siberian territory north of the Argour and Amur Rivers, abandoning for the time her more venturesome projects to the south. Hence these years were not marked by the acrimony of the preceding ones, as each nation was

occupied in separate domains—Russia in North Manchuria, the Baikal, Amur, and Maritime Provinces; Japan in Korea and South Manchuria. Russia endeavored to hold her interests in North Manchuria at all costs, since whoever occupied Harbin held the security of Vladivostok. But she immediately saw the weakness of her Siberian line, such a great part of which lay in other than Russian territory, and she feverishly began the construction of her Amur Railway, joining Chita and Vladivostok via Kharborovsk; which line she has since completed and double tracked. The trans-Siberian railroad now lies entirely within Russian domains. The strategical significance of this is apparent to all, especially to the Japanese. (The Amur Railway can not be commercially profitable for some time; in 1910–1912 the Siberian lines operated at an annual loss of 20 million rubles.) Furthermore, Russia energetically commenced the task of making Vladivostok her stronghold in the east. All of these efforts were undertaken because Japan's victory had blanked off Siberia on the south and this had taught Russia a great lesson—one that is very pertinent in connection with this essay.

The year 1914 found Russia and Japan in these relative positions, and by this time Russia had in every way greatly strengthened her entire eastern empire. In 1916, during the course of the war, Russia and Japan signed a convention to the end that neither would be a party to any combination directed against the other, but this was never ratified nor put into effect. However, even in such a treaty as this, the opposition of interests is shown by Mr. K. K. Kawakami in his Japan in World Politics when he writes: "Important as the new privileges secured by Japan are ('privileges' in Manchuria, secured from Russia by this treaty), they are far from what she really desired. Nevertheless, the concessions she has obtained will afford her easier access to eastern Inner-Mongolia." While Russia was heavily engaged in Europe, Japan had been comparatively free, and she took advantage of these circumstances to strengthen herself materially and further to spread her influence on the Continent—the above comments of Mr. Kawakami, the Japanese occupation of Shantung, and her notorious 21 demands on China being examples. Although not permanently successful in these particular ventures, they served to show along which path her ambitions lay; and she was to give further evidence in another sphere during the Russian revolution.

The history of the Siberian turmoil, beginning in 1917, is to voluminous to be extensively covered here. Briefly, for our purposes, it serves to exhibit Japan's ultimate desires in Siberia. Russia was in revolution, Japan's original intervention was suggested by the United States, apparently a better opportunity could not be asked for. The fact that Japan was thwarted does not lessen the importance of that which is to be learned from her endeavors.

Japan's desires for intervention first appeared in the spring of 1918, when Japan agreed with China for joint military and naval action in Siberia. This was not undertaken extensively, however, as in August of the same year, as a result of allied pressure, our Government announced its intention of intervening in easter Siberia for the protection of the retreating Czechoslovak troops and Japan was invited to do the same. Needless to say she did not hesitate. Each nation was to send not more than 7,000 soldiers, which were to be withdrawn immediately the safety of the Czechs was assured. Each government solemnly announced that it had no political nor economic designs on the occupied territory. The expedition was to be confined to the southern end of the maritime province.

We stood by our original declaration throughout, but we unwittingly gave Japan her opportunity. By October, Japan had advanced to Baikal; had more than 70,000 troops in Siberia and 30,000 in northern Manchuria; had begun extensive economic exploitation projects in Siberia; and virtually controlled, from Lake Baikal, all of Siberia to the east and Manchuria to the south.

Concerning Japan's intentions in this intervention, Dr. A. L. P. Dennis, in his recent comprehensive work, The Foreign Policies of Soviet Russia, states:

"By the unconscionably large military forces that they poured into eastern Siberia in the autumn of 1918, and by the flood of Japanese commercial agents and Japanese merchandise which they sent in, it was asserted that they hoped to consolidate their position in Siberia. And this was in the face of the solemn declaration of disinterestedness by the Japanese Foreign Office in August, 1918. The evidence in support of this charge now seems overwhelming. Moscow by this time was red with the international, but, as previously noted, where Russian interests are threatened, the Foreign Office in Moscow is truly Russian. Russian patriotism was aroused over the Japanese activities; the press was frantic.

By the end of 1919 American opposition toward our intervention in Siberia, nominal as it was, had greatly increased, and on January 17, 1920, the evacuation of our troops began. On the other hand, Japan dispatched more troops to Siberia, to hold the territory east of Baikal, and consolidated her hold upon the railways and cities of this area. Speaking of this period, Mr. Putnam Weale states that: Just as American intervention in 1918 was only a part of a general policy toward Russia, so were the events around Vladivostok and the Siberian railways but incidents in the general and permanent Japanese policy of dominating the Asiatic seaboard.

The depredations committed by Japan in Siberia during the first half of 1920 brought from the Inter-Allied Technical Board "protests in the strongest possible manner against the interference and high-handed actions of the Japanese troops." In May occured the Nikolaievsk "massacre" (a godsend for the Japanese) and Japan immediately occupied the remainder of Sakhalin and the adjacent Siberian coast. All of the Russian littoral from Korea to Okhotsk and all the fisheries contained thereon were then in Japanese hands. In December, 1920, the Japanese consul general at Vladivostok notified the Minister of Foreign Affairs of the Vladivostok government that in the future

all of the fisheries of the lower Amur region and adjacent islands would be under the control of the Japanese command; no reason was assigned and no attention paid to the ensuing protests. In March, 1921, the Japanese reoccupied Nikolaievsk, ordered 10,000 more troops into Siberia, and seized the fisheries of Kamchatka with their destroyers, thus extending their hold to the Behring Sea. The situation was becoming unbearable, and in April the Government of the Far Eastern Republic squarely raised the moral responsibility of the United States when it asked us at what time we would put an end to this intervention which had begun in 1918 at our instigation. In May we dispatched to Tokio a note, stating in part: The United States can "neither now nor hereafter recognize as valid any claims or titles arising out of a present Japanese occupation or control; that it can not acquiesce in any action taken by the Government of Japan which might impair existing treaty rights or the political or territorial integrity of Russia."

And Doctor Dennis adds: "Such language clearly indicated that the United States was aware of the attempts which the Japanese were making to consolidate their economic, if not their political, penetration of Siberia under cover of the military occupation."

The "Far Eastern Republic" was created in April, 1920, out of the welter of contending factions in Siberia. There is no more convincing proof of the Russian spirit of nationalism which shows itself through the Bolshevist government than Moscow's attitude toward this abortive Republic. From its inception as an independent State the hand of Moscow was everywhere evidenced. From the very start the Soviet Government looked upon the Far Eastern Republic merely as a makeshift creation, designed to protect it from Japan, and in this way to afford it a needed breathing space. Indeed, the leaders of the Republic were Russians, and they undoubtedly intended from the first that their State should eventually form a part of the new Russia. To-day the Far Eastern Republic, although nominally one of the many autonomous bodies forming the "Union of Socialist Soviet Republics," is as much a part of Russia as is the Ukraine. Japan, too, favored the creation of this Republic, but for other reasons. She desired to keep the Russian Bear at a distance and to build up a government at Chita, which would be a buffer State, entirely independent of Russia, and one which she could control for her own interests in Siberia. A strong Russia would be a menace to Japan; an understanding with a weak Siberian State would be a welcome contingency. The Russians of all factions knew this only too well.

Following our note of protest to Japan in May, we dispatched another one in July inviting her to attend a conference in the ensuing November at Washington on Far Eastern and Pacific questions, amongst them Siberia. Upon receiving this Japan lost no time in coming into conference with the Far Eastern Republic, hoping thereby to consolidate as many of her Siberian holdings as she could previous to the Washington conference and then to present the latter

with a fait accompli. The Far Eastern Republic conference met at Dairen in September and the demands presented by Japan furnish another excellent indication of her desires in Siberia, which, be it remembered, were not overlooked in the slightest by Moscow nor forgotten by the Russian people. They included a demand for broad economic privileges, the lease of northern Sakhalin, unrestricted navigation on the inner reaches of the Amur, the permanent demilitarization of the Siberian coast, and the opening of Vladivostok as a free port. Naturally the conference came to a standstill and it had little utility other than to expose again Japan's Siberian ambitions.

The failure here and the results of the Washington conference indicated to Japan that her Siberian ventures were for the present impossible, and in the summer of 1922 she announced her intention of withdrawing her troops from the Siberian mainland, which, of course, she followed in the ensuing October.

Since 1922 Russian and Japanese conflicts have been transferred from Siberia to Sakhalin and China—areas of conflict since 1866—and in which to-day Russia's contentions are much the same as when her policies were promulgated by the Czar.

The Japanese refused to evacuate Sakhalin until they received compensation for the Nikolaivsk "massacre," while the soviets maintained that they were not responsible for that incident. Thus two years dragged on with Japan plainly holding the massacre over the head of Russia in order to obtain certain privileges when negotiations could be seriously undertaken. Finally, in January of this year, the soviet and Japanese ambassadors in Pekin signed a treaty for their respective Governments, attached to which was a protocol allowing Japan extensive concessions in northern Sakhalin. Japan thus emerged from her Siberian venture not as well as she had originally intended, it is true, but still in control of 50 per cent of the northern Sakhalin oil fields and in addition extensive exploration, coal, and timber concessions. That Russia had agreed to these concessions grudgingly and with the intention of simply making the best of the situation until she had gained further strength was evidenced in November of this year, when the final concession articles were haltingly negotiated in Moscow.

The struggle proceeding at present in China between Japan and Russia is an economic and political one, fundamentally, but a continuation of the conflict of these nations, that was begun before the World War. It is a very complex situation, with Russia endeavoring to stir up the Chinese against all foreigners while strengthening her own economic position in Manchuria and aiding the Canton army. While Japan retaliates with such measures as the support of Chang-Tso-Lin, the Manchurian war lord, and the recently announced con-

struction of branch lines from the South Manchurian railway which would tap into the rich territory at present feeding into the Russian-controlled Chinese Eastern Railway. But there is little that is new in the underlying causes of these manifestations—they would probably be much the same were the imperial government still in power in Russia—because they spring from a natural and national conflict of interests and aims.

The recent treaty between Soviet Russia and Japan demands a moment's consideration. When this was ratified it was loudly proclaimed as marking an era of peace between the two nations in contrast to their many disputes in the past. But this has proven to be more smoke than fire. True, it renewed diplomatic and commercial relations, but the deep political and economic conflicts of those two nations in the Far East have been little affected, if at all. Kharakan, the soviet ambassador at Pekin, who negotiated the treaty for Russia, was quoted eight months after its signature (Nation, September, 1925) as saying: "There are several points at which Russian and Japanese policy clash in the east. First of all in regard to the whole attitude of Japan toward the Continent. When Japan speaks of an Asiatic alliance, the alliance seems to bear some resemblance to that between a hungry stomach and a piece of bread." While Ivanov, the present soviet general manager of the Chinese Eastern Railway, tells the Harbin correspondent of the Japan Advertiser that the Russian-Japanese agreement is a flimsy expedient which Russia will abrogate when desirable, while Russia will not cooperate with Japan in developing the oil resources of northern Sakhalin.

In these conflicts with Russia in Siberia and Manchuria, Japan is striving for two immediate objectives—first, a continental rear made secure to her by actual control, which would also take a portion of her surplus population; second and supplementary, an Asiatic mineral and economic base. Here are some frank admissions by the well-known Japanese author, previously quoted, Mr. K. K. Kawakmi, in his "Japan's Pacific Policy": "She (Japan) must perforce turn her attention toward the Far East and must seek new fields of activity in the countries on the Asian continent. It matters little whether these countries are under Russian or Chinese jurisdiction. Call it what you will, Japan's national desire for expansion is based upon economic necessity. We must not lose sight of the fact that military aggression is only incidental to Japan's popular clamor for economic expansion." And Gen. N. A. Golovin, in his recent "The Problem of the Pacific in the Twentieth Century," collaborates when he remarks that "the four-power pact had the narrow aim of defending the islands of the Pacific and it thus indicates to Japan the access to the next stage of her progress—the Continent of Asia."

Such, to the present day, is a brief record of the continual conflict of Russian and Japanese interests in the Far East which, during the last few years, have become more portentous than ever before because each year brings closer the ultimate struggle of these two nations for supremacy in the Far East.

The predicting of the actions or sentiments of any nation in relation to another which might be at war with a third is always risky, often ridiculous, and the best-grounded political, economic and military presumptions are apt to be rudely overthrown. Such, for example, was the error of Germany, before the war, in her consideration of England, in her view of us before 1917. But, despite the fallibility of all assumptions and predictions in this matter, the delving into the future with the facts of the past and the present affords us our best means of arriving at logical conclusions and of directing our course intelligently. In the case at hand, taking the past and the present as our guides, let us proceed.

It has been the unanimous opinion of well-informed Russians to whom the writer has spoken that Russia has as vital a concern in the power of Japan as has America. A victory of Japan over America in the eastern Pacific would increase the strength and prestige of Japan to such an extent as to make her (as far as Russia is concerned) virtually master of the Pacific and the Orient. For the supremacy of the Pacific, which Japan would thereby attain, would be exerted not only on the seas and islands of that ocean but even more so upon the mainland of Asia, from the Behring Straits to Singapore. A victorious Japan would put Russia in an impossible position. It would mean the actual blanking off of Siberia by sea and land, the establishment of Japanese supremacy over all Manchuria, and would be the great step in the Japanese acquisition of Vladivostok, Sakhalin, and the Pacific littoral of Siberia. It would mean the descendancy of Russia in the Far East. For these reasons and in the light of the historic conflicts of Russia and Japan in the Far East, is it illogical to conclude that Russia would be the opponent of Japan and the ally of the United States, were the latter two to come to hostilities, and this quite aside from and in addition to Russia's close friendship and trust in America? And does this not suggest a new aspect of the importance of Russia to our Navy?

III

Let us examine a few considerations that come to mind from the standpoint of Russia as our moral, if not our physical ally. Remembering that these, like the fundamental assumption of Russia's attitude, are not infallible but that their suggestion is at least conducive to thought on the subject.

We might well consider Russian assistance under two conditions—passive and active.

In the former she would not be our avowed ally but would oppose Japanese supremacy as best she could without a declaration of war. This would be, admittedly, a delicate position, and especially so as it is not unlikely that Japan would frantically strive to secure at any cost her Asiatic continental base and the dominance of the entire Pacific coast north of Shantung. And if such should be the case Russia would probably be forced to war and Japan would conduct her military operations against Russia and her sea activities against ourselves. On the other hand, Japan has a high regard for Russia's potentialities and it is possible that she would take care not to offend Russia and would endeavor to make Korea, southern Manchuria, and Sakhalin suffice for economic bases. In 1917, Mr. Kawakami (Japan in World Politics) recorded that "it is a foregone conclusion that Japan will avoid, if she possibly can do so, another disastrous war with Russia, knowing that her resources are too limited to cope with Russia's tremendous potential strength." And, in part history since that time bears out his statement. For Japan's aggressiveness in Siberia declined rapidly as the Far Eastern Republic became a part of Russia and Japan was face to face again with the united strength of the Russian state. It is of interest to note that in Mr. Bywater's recent futuristic work *The Great Pacific War*, he sketches the Russo-Japanese relations during our imagined war with Japan in exactly this light and notes the arbitrary power which Russia holds over Japan and the sacrifices which Japan has to make to keep Russia neutral.

It may be well to remark here that if hostilities with Japan were to come while the Bolshevist régime was still in Moscow we would immediately see a crucial example of the contemporary Russian phenomenon, namely, the conflict between the Internationale and Russian nationalism. The Russian communists (forming less than one-half of 1 per cent of the total population) would undoubtedly try to make of the war simply a means of furthering their revolutionary doctrines. This they outlined during the tenth congress of their party (1921). If their policies were to hold, America could expect no assistance and the Russian people would look on helplessly while their Far Eastern territory was endangered. But the bombastic decrees of the communists rarely hold water when a crisis arrives. This is especially true in their foreign affairs, for, as has been remarked above, it is the spirit of the Russian people not the Third International which directs Russia's foreign affairs when Russian interests are touched. If a conflict between ourselves and Japan should immediately arise, there can be little doubt but that Russian nationalism would overwhelm the Internationale. Let us hope, however, that if such a conflict does come Russia by that time will have a rational government which truly represents her people.

Return to the original assumption of a conflict between ourselves and Japan, with Russia neutral but actively friendly toward us. Even here we find the assistance which Russia could give us would be immense. First, the great port and naval base of Vladivostok, in the center of the Japan Sea, with all of Russia and Siberia behind it, would be a continual nightmare to Japan. Second, Russia could limit or curtail completely the vast economic assistance she might give to Japan and without which Japan would assuredly suffer. Third, Russia could prevent the shipment of munitions to Japan from Europe via the trans-Siberian railway. (This is of great importance in view of the fact that this line forms the only connecting land route of Japan with Europe. Convoys from its terminus in the Japan Sea could be easily protected in their less than three days' steaming to Japan, while the only other connection Japan has to Europe, the sea, is flanked by the Philippines and Singapore.) Furthermore, to obtain the full economic assistance of Manchuria, and quite aside from European supplies and munitions, Japan must have the Vladivostok-Nikotsk-Harbin-Mukden line. Fourth, Russia could hinder Japan in Manchuria and China by means of economic or financial opposition; this is evidenced well enough even in times of peace. The hostility of the Russian-controlled Chinese Eastern Railway and the Russo-Chinese Bank would be almost fatal to Japan, while the extensive Russian interests in Mongolia would threaten Japanese resources there. Fifth, a neutral but unsympathetic Russia would be a constant source of concern to Japan and would necessitate the latter keeping close watch on her Korean and Manchurian frontiers, and to that extent weakening her efforts in the actual theater of war. Sixth, Russian political influence and counsels in Peking might have a strong reaction on the Chinese Government, to the detriment of Japan. This latter point is becoming of more moment each day with the increasing influence of Russia in China.

The second condition, and the one which many Russians believe would exist, is a Russia openly allied with America, should the latter come to war with Japan. This brings us to active military and naval cooperation with Russia which opens up a field of too technical and great a scope to be more than touched upon here as a suggestion of its possibilities. In such a case it is most likely that the war would still be our war and that its prosecution would be largely our task. We could expect no assistance from Russia at sea and her military activities in the east might necessarily be limited. But the invaluable assistance with Russia could give us, that in itself would decide the trend of the war, would be the use of her ports as naval bases, the use of the resources of Siberia during the war, the trans-Siberian Railway for communications and supplies, and Russian

political and economic influence in our favor in China. This assistance from Russia would minimize to a great extent the advantage which Japan inherently has and of which Mahan wrote: "This (nearness to the theatre of war) is the advantage which Japan still possesses over all other nations for action in the western Pacific. The center of her national power is close by the scene of possible international contentions in that which we know as the Far East."

Russia has two Pacific ports of importance—Vladivostok and Nikolaevsk—and of these the former is by far the more valuable in every respect (Nikolaevsk is frozen during the winter and it has no railway connections). Vladivostok has an ideal harbor with two exits, easily defended and accessible the year round; it has the Siberian Railway to draw from; and it stands at the center of Japan's back, in the middle of Japan's sea, and it flanks her routes to the Continent. Its potentialities as a submarine base, if nothing else, are considerable. Mahan considered the strategical situation of Vladivostok, in relation to Japan, as ideal; it fulfills completely the three conditions which he mentions as determining the strategic value of a particular position. The Japan Sea is of vital import to Japan. With it secure she can confidently face the Pacific; if it be lost her fall is only a question of time. The routes connecting Japan with the two main Asiatic railways, of which Vladivostok and Fusan are the terminii, lie through the center of this sea. Owing to the present weakness of Russia, Japan, of course, absolutely controls this water to-day.

The question of the use of Siberia's resources is intimately connected with that of her railways. Siberian resources, coupled with supply via the trans-Siberian line, would probably make any expeditionary forces basing on the Siberian coast practically independent of supplies from America via the Pacific. The capabilities of the Siberian railway have been amply proven in two wars. During the Japanese war, on this railway Russia based 750,000 men in eastern Siberia and could have exceeded this number. And at that time it had only a single track and no loop around the southern end of Lake Baikal. During the late war its services were tremendous. To-day the line is double tracked from Vladivostok to Omsk and from Petrograd to Riasan, 4,000 of the 5,500 miles of its stretch, while the necessity of ferrying across Baikal has been obviated and the main line now lies entirely within Russian territory.

Russian influence in China against Japan and military activities against her in Manchuria would be exceedingly important because they would strike at Japan's economic fabric. The recent Russo-Chinese treaty and Russian propaganda have secured for Russia a position of great political and economic influence in China to-day. Japan is far from self-sustaining, and a sure means of accomplish-

ing her fall would be the cutting off by the sea and land of her supplies from the Asian continent. The world now knows the exhaustion point which Japan had reached in 1905, when President Roosevelt proposed the cessation of her hostilities with Russia. This exhaustion was due to the fact that the territory of the Japanese islands formed such an inadequate economic base. But that war lasted only eighteen months and did not require a fraction of the raw materials that Japan would need for a modern struggle. By means of Russia, Japan's base of supply in Siberia, Manchuria, and China can be cut. If war arrives, the power to control the Far East may be found 6,000 miles from Tokio—in Moscow.

It is probably a summary of all these considerations which induced the Russian, General Golovin, to make the statement (Problem of the Pacific) which is the keynote of his entire book: "The United States can defeat Japan only in alliance with a strong Russia." And these considerations have confessedly inspired the recent remark of Trotzky that, "Soviet Russia is the potential arbiter of the Pacific—Soviet Russia and America find themselves, although not allied, working on identical lines of policy."

IV

Before concluding this essay permit the writer to mention here a matter about which there might exist some misunderstanding. What has been written has been done with no hostility toward Japan and in as impersonal way as possible. For all intents and purposes, the mention of "Japan" might have been omitted and the fictionary "Graustark" substituted, provided that the latter were in the position of the former. We do not seek war; a war with either Graustark or Japan is to be sincerely deplored.

But evasion is not only disagreeable; it is dangerous. We are committed to certain internal and external policies which might, at some future date, bring us into armed conflict with Japan. The latter, on her part, entertains policies to which we might forcibly object. Our Navy is not concerned with the actual conception or formation of foreign or domestic policies. It is not for us to say what and where shall be their application nor to question their moral or legal validity. It is simply our duty to be prepared to carry out those policies should diplomacy and amicable negotiations fail. To this end we but do our duty when, in days of peace, we frankly examine every phase of these policies and those of foreign nations and their possible complications in an effort to remedy our weaknesses, increase our strength, and prepare ourselves to carry on.

In the course of such an examination we find that in case of war with Japan we possess in Russia a friend or ally who quite possibly might mean the difference between victory and defeat. What are we

of the Navy doing to improve this inherent advantage which we already have or what have we done toward even taking cognizance of it? Efforts which we might make now could possibly be counted in battleships if war arrived.

Our efforts can not be devoted toward forming "alliances" any more than they can toward forming policies. But the Navy has it within its power to improve relationships in its own way, and to make serious efforts toward understanding those with whom we are liable to be intimately concerned. Following a long-established practice of naval powers to furnish their naval officers with opportunities to make themselves proficient in foreign languages, we have for several years followed the policy of sending officers to Tokyo, not the least important reasons leading to this decision being the desire and hope that there would follow a more intimate and mutual understanding of the thoughts and aspirations of the two countries.

Is it not also as important for us to understand the language, character, customs, and national aspirations of a nation who in the past has shown such friendliness?

And Russia is even less known to our service than is Japan.

Such a study of Russia, if and when it be done seriously and completely, must be undertaken in Russia. Under the Bolshevist régime and with our lack of official intercourse with Russia this is, of course, impossible at present. However, the soviet is changing its coat each year, and recent events seem to indicate that the opening of negotiations leading toward recognition may not be far in the distance. But this entire essay is written in the light of the future, both as regards Russia and ourselves. It matters little, as far as application is concerned, whether the possibilities of that application come in two or twenty years.

If it be thought, then, that the conception of this essay is premature, I suggest that our Navy to-day can well afford to look ahead over an expanse whose breadth covers 360 degrees of longitude and whose length is only limited by the possibilities of our national strength and the scope of our foreign policies. The greater our forehandedness, the greater our potentialities. We must think imperially.

I close with Mahan: "My last word to you, then, in these preliminary remarks, is to master and keep track of the great current events in history contemporary with yourself. Appreciate their meaning—the sphere of the Navy is international solely."

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OFFICE OF NAVAL INTELLIGENCE
NAVY DEPARTMENT
Washington, D. C.

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In general: Bureaus of the Navy Department; all force commanders; all commanding officers of capital ships, the larger patrols, destroyers, and submarines.

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1926

FOR CONVENIENCE IN ROUTING

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FIFTH DIVISION OFFICER			
SIXTH DIVISION OFFICER			
MARINE OFFICER			

The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

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NOTICE.—Photostat copies of the key to the German system of reference positions used in the Skagerrak Battle (Jutland) are now available. A copy will be furnished upon request.

H. M. S. WARSPITE AFTER RECONSTRUCTION

O. N. I. MONTHLY INFORMATION BULLETIN

VOL. VIII JUNE, 1926 No. 12

BRAZIL

ESTABLISHMENT OF SUBMARINE SCHOOL

A submarine school will be established in the Brazilian Navy for the purpose of preparing officers, petty officers, and sailors to serve in submarines; preparing officers and petty officers in torpedo and mine service; perfecting the technical knowledge of officers in the electric equipment and machinery of submarines, etc.

The school will function in a flotilla of submarines wherever based. Regulations of the Brazilian Navy are applied to the school, and the school will function from the 1st of February as long as decided necessary by the Minister of Marine.

The school will be governed by the commander of the submarine flotilla, and officers, petty officers, and sailors will be taught separately. Oral and written examinations will be given by a commission composed of the director of the school and teachers in it. No special branch of the service of the Brazilian Navy is denied instruction in the school if designated. Various regulations for the school are given in the decree of no importance except to the school.

DENMARK

ACTIVITIES AT COPENHAGEN DOCKYARD

The Copenhagen Dockyard is commanded by Rear Admiral Amdrup, Mr. Nelson is the civil construction superintendent, and Capt. C. A. Schou is head of the torpedo and mining department. This department is engaged at present in the manufacture of torpedoes and mines. The torpedoes are of the Whitehead type, 45 centimeters in diameter, and about 25 were under construction. They are also manufacturing a large number of mines of 100 kilograms charge. They had on hand one mine of 200 kilograms charge which they said was for experimental purposes, and was considered too large for use in Danish waters. In the artillery shops they manufacture guns of small caliber and antiaircraft guns. They also make their own

projectiles, and in the artillery machine shops projectiles up to 6 inches caliber were being finished.

In the machine shop of the engineering department there were three Diesel engines, 6 cylinders each, 450 horsepower, which were built at this yard for two submarines under construction there. A fourth Diesel engine was seen set up in the testing shop and had just completed a running test. Each submarine has two of these engines, or a total of 900 horsepower. The yard is also manufacturing the electric generators for these submarines.

The two submarines under construction here were also seen; one, the *Daphne*, was launched in January, 1926; the second was still on the building ways, and is expected to be launched in about a month. She will be called *Dryaden*. They expect to complete the first-mentioned submarine in August, 1926. They are of 306 tons surface displacement; 370 tons submerged.

The torpedo boat *D–1* (*Soridderen*) is undergoing a general overhaul. The *Nils Juel* and three other coast defense vessels are at the yard under repair.

The yard is divided into a military and civilian department. The military department has charge of the torpedo, mining, and artillery work. The civilian department has cognizance of the construction and repairs in general. About 1,200 men are now employed in the civil section and about 200 in the military section.

The yard is at present constructing a commercial passenger plane for the Dansky Luftfart Selskab—a 12-passenger carrying plane constructed entirely of wood, Farman type, land plane. The yard has orders for two of these planes. No other planes are at present under construction in the yard, although they have built some other planes for the navy which are of a modified Sopwith type.

FRANCE

TEST OF LOTH AIRPLANE-GUIDING APPARATUS

[Source reliable]

The following information concerns the results of tests made with the Loth guiding apparatus, an electric cable direction finder for airplanes.

The first trials were carried out on a line placed at Villacoublay. It was too short and very imperfect; its length was only 3 kilometers, and it followed a polygonal course. Nevertheless these trials have shown that the signals given out by this line were received perfectly at 2 kilometers on either side of the line up to 2,000 meters in altitude.

H. M. S. NELSON, APRIL, 1926

QUARTER VIEW H. M. S. NELSON, APRIL, 1926

They enabled one to distinguish clearly if one drew away from the cable or approached it; if one was to right or left; and one could tell very clearly the moment one passed above the cable. These trials lasted about three months.

GREAT BRITAIN

NAVAL NOTES

H. M. S. "Warspite" after reconstruction

Supplementing information given on pages 19 and 20 of January (1926) BULLETIN, the frontispiece shows H. M. S. *Warspite* as she appeared when issuing from dockyard hands after her recent reconstruction. It will be noted that a more elaborate structure has been developed for fire control and navigating purposes inclosing the mainmast, and that the forward smoke pipe has been merged with the after smoke pipe inside a single casing. It is understood these changes were forced by gunnery objections; the gunnery people demanded more accommodation for fire control and, at the same time, better protection from smoke.

The *Warspite* has been fitted with bulges of the normal construction which are evidently not like those of the later type on the *Nelson* and *Rodney* and do not have the large number of holes in the upper portion which were shown on the photographs of the *Nelson*. In the case of the *Nelson* the holes shown are understood to be vent holes for the gases of explosion. On the photograph of the *Warspite* manhole plates will be noted, but these are understood to be required for access to the bulge compartments for purposes of inspection and painting.

Progress of H. M. S. "Nelson"

Photographs show progress on H. M. S. *Nelson* as of April 15, 1926.

The holes in the upper part of the bulged side, which have been referred to in the November (1925) issue of the BULLETIN, can be seen. Attention is invited to the view of the conning tower and to the three twin turrets on a side for the secondary battery, the latter confirming previous information as to the location of this battery. It is understood that the quarter deck will be occupied by a group of antiaircraft guns whose fire will be controlled from an after position.

It will be noted that the smoke pipe is located forward of the mainmast rather than abaft it.

H. M. S. "Glorious"

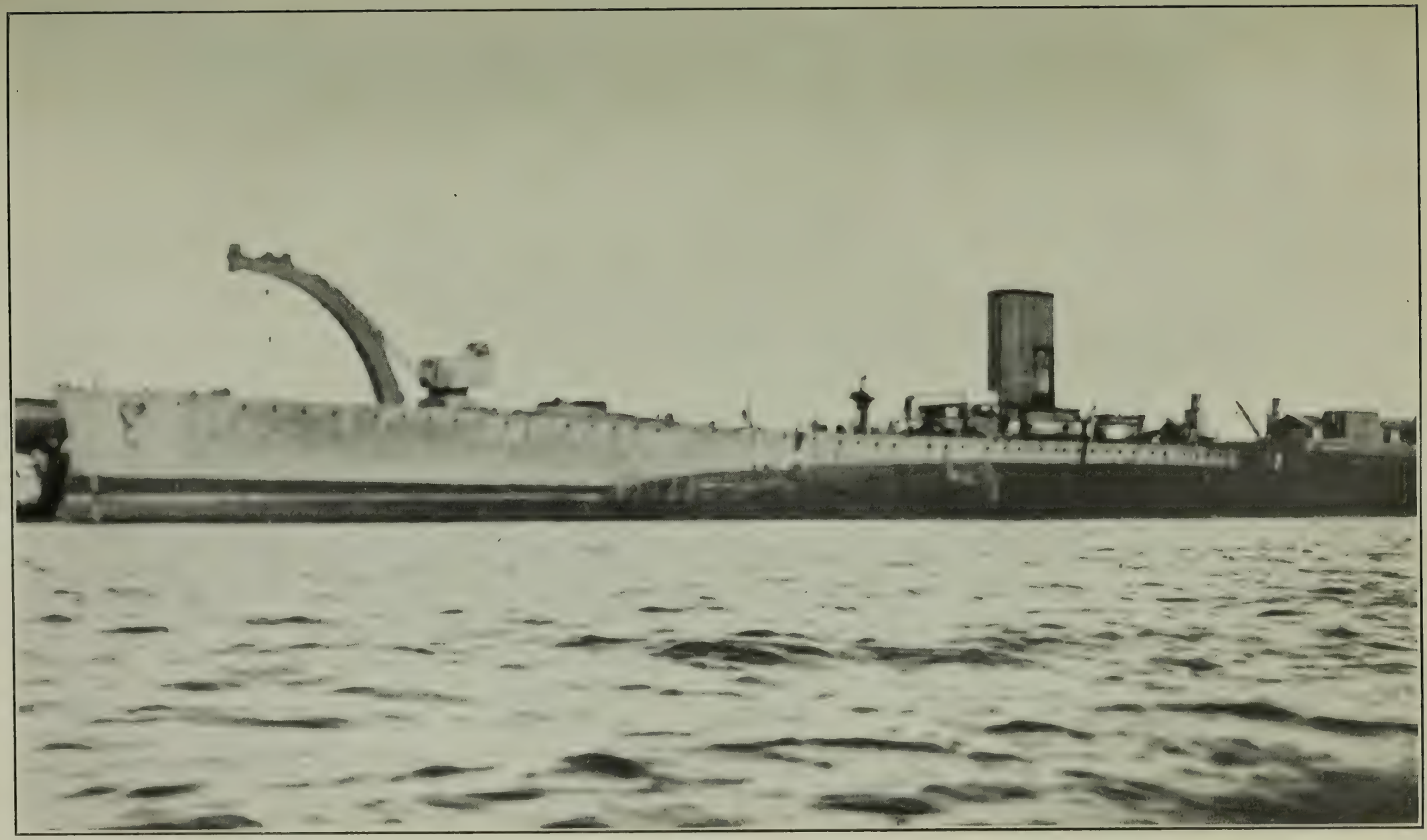
Photograph shows H. M. S. *Glorious* on her recent arrival under jury rig at Devonport to be converted to an aircraft carrier. It will be noted that the new bulges fitted at Rosyth during her stay there are of much greater height than formerly. It is understood that the beam and displacement of the vessel have been materially increased. There is gossip to the effect that greater beam was considered necessary to preserve stability when a high and wide flying deck is built on her.

H. M. S. "Enterprise"

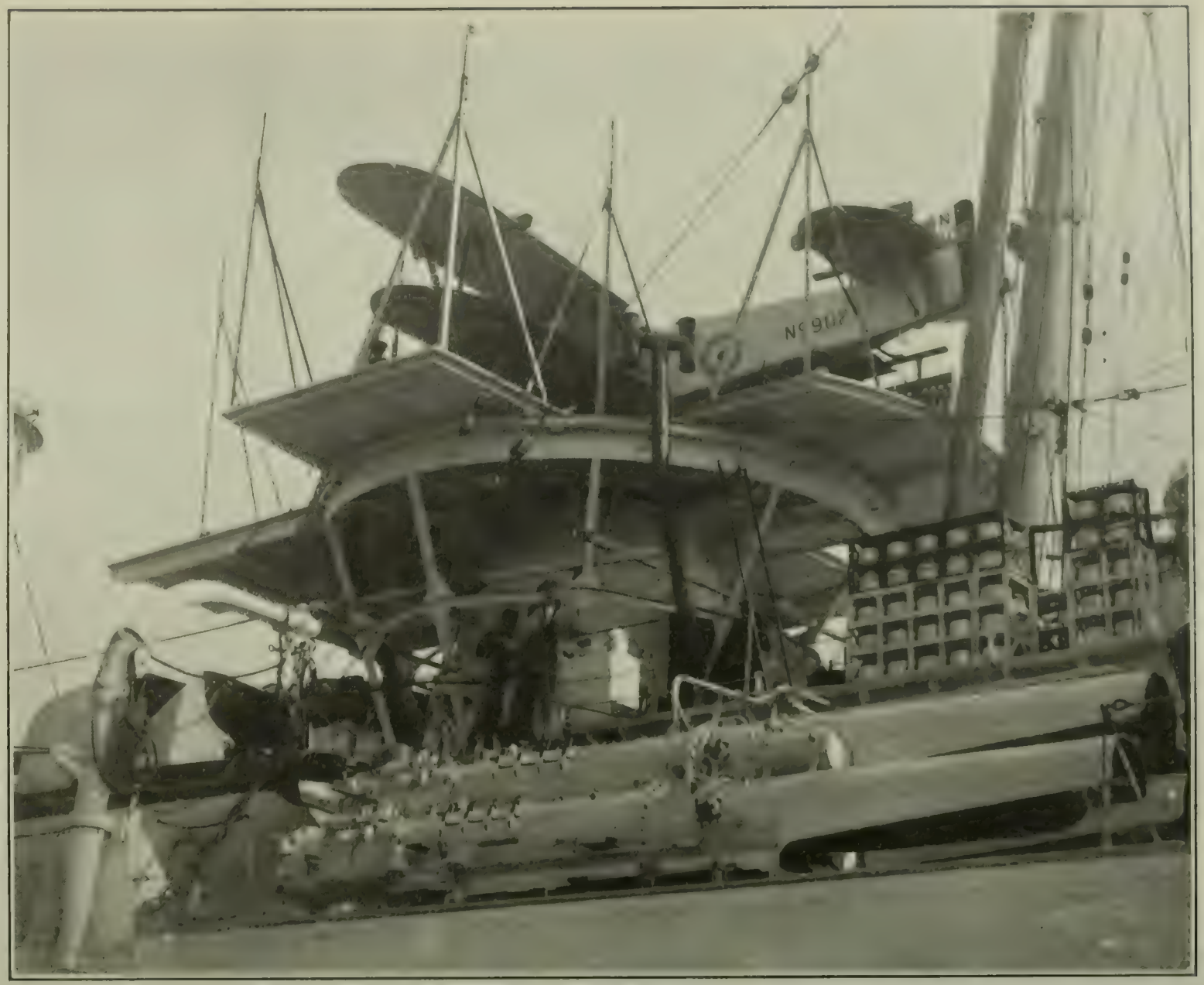
There is a twin 6-inch mount and gun shield forward in place of the two single mounts orginally contemplated as shown in Jane's Fighting Ships, 1925, page 49. It is also noted that the sketch in Jane's is incorrect as to bridge and top structures, and an A. A. gun is now mounted aft on the end of the superstructure in a position to interfere with stern fire from one of the 6-inch guns. The airplane launching platform shown in the photograph is not shown in Jane's. It is located just forward of the mainmast.

Damage to H. M. S. "Emerald"

Early in April the cruiser *Emerald*, which had recently arrived on the East Indies station, developed defects that were alleged to be of a serious character. Press messages stated that sea water was entering the fresh-water tanks, and that the condition of the ship gave cause for anxiety. She was placed in dock at Colombo, where an inspection showed that the damage called for more extensive repairs than could be undertaken by the local yard. The *Emerald* has therefore sailed for Malta, where she will be thoroughly overhauled. The fact that she is making this long voyage indicates that the first reports of her unseaworthiness were greatly exaggerated. Nevertheless, an incident of this kind is so rare in the British Navy that it is bound to cause remark. The *Emerald* was laid down by Armstrong, Whitworth & Co. two months before the armistice. In common with other unfinished ships of the war program, her completion was retarded in the interests of economy, and after being launched in May, 1920, she was towed to Chatham Dockyard to be fitted out. There she remained for well over five years. This policy of slowing down work on warships, although prompted by motives



CONVERSION OF H. M. S. GLORIOUS, MAY, 1926



H. M. S. ENTERPRISE, AIRPLANE STOWAGE

of economy, has proved extremely wasteful, and it has had the further disadvantage of unduly exposing such ships to the processes which tend to the deterioration of their structural material. The *Emerald* and her sister ship *Enterprise* are the fastest cruisers hitherto built for the Royal Navy. They have geared turbines of 80,000 horsepower for a speed of 33 knots, but since no details of the trials were released, it is not known whether this speed was actually attained.

H. M. A. S. "Melbourne"

The Australian cruiser *Melbourne* left Portsmouth on May 1 for Malta to complete her period of attachment to the Mediterranean Fleet, in which she replaced the cruiser *Delhi*, attached to the Australian Fleet for six months. This period will end in June.

Minelayer "Adventure"

The naval estimates 1926–27 give the following official characteristics of the *Adventure:*

Length, 500 feet; breadth, 59 feet; mean draught, 14 feet 5 inches; standard displacement, 6,740 tons; 40,000 S. H. P., 27.75 knots. Four 4.7 and four 3-pounder guns. The costs are estimated as follows:

Hull	£455, 637
Machinery	550, 845
Ordnance	103, 361
Establishment charges	171, 409
Total	1, 281, 252

Expended in 1925–26, £795,119.
To expend in 1926–27, £464,049.
Remaining to complete, £2,085.

Date of completion, fiscal year 1926–27.

Of the ordnance cost, £20,000 is for guns and £83,000 for "transferable gear," presumably mines, ammunition, etc.

Displacement (standard) is without fuel and reserve feed water.

Destroyers "Amazon" and "Ambuscade"

It is stated that the displacement without fuel and reserve feed water of the destroyers *Amazon* and *Ambuscade* will be 1,330 and 1,210 tons, respectively.

The official characteristics of these vessels are given in the naval estimates as follows:

	Length	Breadth	Depth	Displacement	Velocity	Armament	Cost
	Feet	*Feet*	*Feet*	*Tons*	*Knots*		
Amazon	311–9	31–6	9–1	1,330	37	Four 4.7 and two 2-pounder guns	£329,816
Ambuscade	307–0	31–0	8–3	1,210	37	do	£335,145

The draft, displacement, and speed refer to a "standard displacement" which is understood to be the Washington Treaty rule as applied to other classes of warships, and apparently confirmed by the above-quoted statement from "Engineering."

Both vessels are due to complete in the fiscal year 1926–27.

Type O submarine

It is learned from a reliable source that the type O submarine has six bow torpedo tubes only.

Contracts for five new submarines

It is stated, in Parliamentary Papers, that the contracts for the five submarines specified in this year's Naval Estimates will not be placed until toward the end of November.

GREAT BRITAIN

NAVY SMALL-ARMS PRACTICE

In the last year, apparently, the Admiralty has ordered all the naval forces to concentrate on small-arms training. The Marine Corps form the nucleus for the instructions.

In the Asiatics this is carried out on the rifle range on Stonecutters Island, Hongkong in the winter, and at Wei-hai-wei in the summer. The drillmasters observed were all marines—efficient, cursing, sarcastic, forceful, and quite vicious looking. All hands were drilled in their dress blues with full packs and equipment from 7 a. m. till 1 p. m. with only short rests. The training starts with bayonet exercises for three days. Three days of rifle instruction and then they are allowed to fire at 30 yards. When sufficiently well trained here they go to the regular rifle range and fire the instructional practices 1–9 listed below. They then fire for classification, practice 10–17.

They are then given three days' instruction on the Lewis gun, and allowed to fire at 30 yards. After three days training there they go to the regular range again to fire for Lewis gunner qualification.

Competitions for the Active Service Trophy or Stamina Cup were held. The three best teams at Hongkong are sent to Wei-hai-wei each year for final competition. One squad of men forms one team. It includes a Lewis gunner with two pans of ammunition. The riflemen each carry 40 rounds of ammunition. They assemble in active service uniform with all equipment at the 700-yard firing point, and start on a forced march of 12 minutes. This march takes them over embankments, hills, barb wire, and finally they are forced to run over a stretch of heavy, sandy beach to reach the 700-yard firing point before 12 minutes and 30 seconds in order not to be disqualified. Twelve minutes 30 seconds after the hike starts a Lewis gun target and one squad group target appear. They stay up and are fired at for 45 seconds. The Lewis gun is then put out of action, and 30 seconds later a pair of moving silhouettes appear at the center of the butts and " walk " out to the ends and disappear 15 seconds afterwards. This is then repeated. Firing at these must be done at the 600-yard range. As they are hit they disappear. Advance is made to the 500-yard range and fire opened on 10 white tiles, which have been erected at the 200-yard firing point. These tiles are merely white sqares of iron set on short sticks with platforms on top. It is necessary to knock over these tiles before the advance can be made from the 500 to the 300 yard range. At the 300-yard range four groups of " section " targets appear and stay up until the end of the competition. The total length of time is 19 minutes 30 seconds, of which 7 minutes is firing time, two points for each shot hole in the target are given; 10 points deducted for each target not hit.

The best scores this year were made by the team from the H. M. S. *Tamar*, which made 368 points on two consecutive days. The next best was from H. M. S. *Hawkins*, which made 285 points.

Another competition is similar—but without the hike. Also targets appear at surprise intervals while the advance is being made. It is called the Peking Cup Competition.

The British service revolver is much easier to hit with than our pistol, due, it is thought, to the size of the sights. They are much larger than our sights—especially the front one—and the target is not lost so readily. The grip, however, is very awkward to one not having used a revolver before.

The pistol range (also used for 30-yard Lewis gun and rifle) is marked off from 100 yards to 10 yards at 5-yard intervals.

The range is of the ordinary type, running from 800 yards to 50 yards. A very efficient underground telephone system is provided.

Below is a table giving the rifle practices carried out by the British Army, Navy, and Marine Corps.

Rifle Instructional Practice

[Form: (P) stands for practice; (T) for target; (D) for distance; (R) for rounds, and (H) for highest score possible]

No.	(P)	(T)	(D)	(R)	Remarks	(H)
1	Grouping	Grouping	100	5	Lying, slow fire, fixed bayonets	25
2	Slow (gas)	Small	200	5	Standing, taking cover in a trench provided with elbow rest. Gas mask in ready position, rifle unloaded, shells in pouch. On word "Gas" firer adjust mask, loads and fires—slow fire, fixed bayonets.	20
3	Rapid	Small	200	5	Standing at "Order arms" rifle unloaded, bayonet fixed, shells in a buttoned pouch. When rapid fire is given, lie down and start firing, 35 seconds allowed.	20
4	Slow	Small	200	5	Kneeling (if wearing spurs use of sitting position allowed if desired) fixed bayonets.	20
5	Snapshooting (from cover).	Large snapshooting.	200	5	Standing, fixed bayonets. Take cover in a trench provided with elbow rest. Firer in ready position with 4 rounds in magazine and one in chamber, every part of rifle concealed. Sights adjusted safety on target exposed 5 seconds, one shot fired and come to concealed position again.	15
6	Slow	Small	300	5	Standing, fixed bayonets. Take cover in trench provided with elbow rest.	20
7	Slow	Large	500	5	Lying	20
8	Firing with movement.	Large	500 to 100	10	During firing advance 600 to 100 yards. Initial position 600-yard firing line, lying, 9 rounds in magazine and 1 in chamber. Rifle on "safe." Advance to 500, 400, and 300 yards, firing 2 rounds from each lying in open. Advance to 200 and 100 yards—firing 2 rounds each, kneeling in open. Bayonets fixed before firing at 300 yards. Targets marked after each shot. Apparently no time limit.	40
9	Grouping	Grouping	100	5	Lying. Bayonets fixed. Slow fire	25
10	Snapshooting from cover.	Snapshooting, large.	200	5	Standing. Take cover as in No. 5. Four second exposures for each shot. Fixed bayonets.	15
11	Timed (gas)	Small	200	5	Lying—gas mask ready, rifle unloaded. Shell pouch buttoned. On word "gas" put on mask, load and fire. One minute. Fixed bayonets.	20
12	Slow	Small	300	5	Kneeling (or sitting if spurs are worn). Bayonets fixed.	20
13	Rapid	Small	300	15	Stand. Take cover in trench with elbow rest. Position same as No. 5, practice before target appears. Load from pouch after first 5 rounds. Rifle kept on top of trench 1 minute. Fixed bayonets. Bull's-eye counts 3. Inner counts 3. Magpie counts 2. Outer counts 1.	45
14	Slow	Large	500	5	Lying	20
15	Fire with movement.	Large	500 to 100	10	Firer lying on 600-yard line, rifle safe. One round in chamber and 9 in magazine before first advance. Fires 2 rounds only at 500, 400, and 300 yards (lying in open), at 200 and 100 yards (kneeling in open). One minute for each advance and firing 2 rounds. Fifteen seconds between "cease firing" and "advance." Bayonets fixed at 300 yards.	40

Rifle Instructional Practice—Continued

No.	(P)	(T)	(D)	(R)	Remarks	(H)
16	Fire with movement.	Fig. 2 silhouette.	200 to 50	5	Slow advance in line. Firer at "Order arms," rifle loaded and safe. Carry gun at "high port" while advancing. Targets exposed four seconds when firer is at each of following distances: 175, 150, 125, 100, and 75 yards. One shot at each distance.	15
17	Fire with movement and use of bayonet.	Small	450 to 300	5	One bayonet sack for each firer 15 yards to rear of 300-yard firing point. Firers lying, rifles loaded and locked, 50 yards behind 400-yard firing point. One minute allowed to advance and fire 2 rounds at 400 yards. Fifteen seconds interval, during which bayonets are fixed. One minute allowed to advance 100 yards, bayonet the sack, and fire 3 rounds at 300 yards. Hits count as in No. 13. No points allowed for bayonet work, but it is to be carried out with dash, accuracy, and correct style.	15

Highest possible score, 215 points.
Marksman, 140 points or over.
First-class shot, 120 to 140 points.
Second-class shot, 90 to 120 points.
Third-class shot, less than 90 points.

ITALY

MISCELLANEOUS NOTES

Italian Schneider cup racers

It has been ascertained from a source believed to be reliable that the two seaplanes now being built by the Macchi Co. for the Schneider cup race this fall, will be twin-float monoplanes, powered with a Fiat A–22 engine. It is understood that the power of the A–22 engines for these racers will be boosted up to about 550 horsepower by increasing the compression ratio.

No information as to the details of the design or the expected performance of these racers is available.

Corrections to Jane's Fighting Ships—Italy

The following important corrections to Jane's Fighting Ships, 1925, have been received from the Ministry of Marine:

P. 224. *Trento* and *Trieste*. The number of antiaircraft guns, given as 12, has not yet been definitely decided upon.

P. 229. The number of destroyers under construction is 15, including three units of the *Sella* type not yet completed, and not 12.

P. 237. Submarines of the *Masaniello* class. Cancel "4 *Bernardis* type," etc., and write instead: "4 *Cavallini* type—*Masaniello*, *Pier*

Capponi, Tito Speri, Giovanni da Procida—ordered from Cantiere Navale Tosi, Taranto." The appended note is wrong.

P. 237. Submarines of the *Pisani* class. Correct: "4 *Bernardis* type, *Vettor Pisani, Giovanni Bausan.*

P. 241. Training ships: Add *Cristoforo Colombo*, whose former name was *Patria.*

Growth of the Fascist Party

The secretary general of the Fascist Party, Turati, has stated in his report that the situation of the party is satisfactory throughout Italy. Up to April 21, the membership had reached 742,178, an increase of 326,596 over the preceding year. The party directorate has decided not to accept further applications for membership this year, but that new requests for admission will be considered in 1927.

JAPAN

MISCELLANEOUS NOTES

[From the Japanese press]

"Furutaka" to be attached to fifth division

The *Furutaka* (7,100 tons), recently completed, arrived at Sasebo on April 5, and, after taking on supplies and fuel, left for Darien to join the second fleet, relieving the *Natori* as flagship of the fifth division.

Fire on board "Kinu"

Fire broke out in the wireless room on board the *Kinu* on April 28. The wireless room was bady damaged as well as the apparatus before the fire was extinguished. The cause of the fire was due to defective wiring.

Crusier Nachi

On account of damage caused by the falling of a crane on the crusier *Nachi* on the building ways, it was thought that her launching would be delayed six months. However, the construction department of the Kure Navy Yard employing 300 men working day and night have made up the time lost by the accident and as a result the work on the *Nachi* is now progressing as per original

schedule and it is expected she will be launched in the middle of October.

Thirtieth destroyer division

Destroyers *Nos. 19* and *21* (both 1,445 tons) which were recently completed have been assigned to the newly organized thirtieth destroyer division, this destroyer division to be attached to the second destroyer squadron.

Four new destroyers

The four destroyers authorized by the recent Diet will all be laid down this year. Final plans regarding construction and armament have not yet been decided upon by the Japanese Navy Department. These destroyers are to be built at the following yards: One at Sasebo Naval Station, one at Maidzuru Naval Station, one at Uraga Shipbuilding Yards, and one at Yokohama Dockyards. They will be of 1,700 tons displacement.

Destroyer Uzuki to be recommissioned

The destroyer *Uzuki* (381 tons) decommissioned December 1, 1924, at Kure and ordered to be sold will be put back in commission and used as a training ship for Kure Naval Barracks. The *Uzuki* is undergoing repairs prior to being assigned to her new duty.

Submarines Ro–27 and I–51 damaged

Ro–27 which had just completed the first term of training left Terashima Channel on April 26 and while under way collided with *Ro–28*, sustaining serious damages to her rudder gears, forcing her to leave her division and proceed to Sasebo where she was docked for repairs.

I–51 while engaged in maneuvers sustained damages to her engines and on arrival at Kure on April 28 went into dock for repairs.

Submarine I–63 to be built at Sasebo

The Sasebo Navy Yard received an order from the navy department for the construction of submarine *I–63*, same type as the *I–54*.

NOTE.—The above is particularly interesting in that if true it confirms the opinion that 13 fleet submarines were to be built under the present program. *I–63* should then be the highest and last number of the fleet submarine class *I–52* to *I–63*, inclusive.

Cruise of submarine I–1

The submarine *I–1* started on a long distance cruise on April 24. She will cruise around the Marshall and Caroline Islands to undergo the following tests:

Submerged run under tropical heat conditions.

High speed run.

Endurance run.

The *I–1* is expected to return to Kure on May 4, covering a total of 3,0000 nautical miles on the cruise.

About 40 people were designated to board the *I–1* during these tests, these including the authorities on submarines attached to the submarine school and navy yards.

Submarine nets to be manufactured

The Japanese Navy is studying means of protecting harbors from enemy submarine attacks, and as an experiment will manufacture a torpedo net measuring from 300 to 360 feet. This net is to be stretched across one of the naval ports and if the result is satisfactory, funds will be appropriated for this purpose from year to year. The sum of ¥150,000 has been appropriated under the current year's budget under the appropriation "Expenditure for adoption of modern arms."

NOTE.—This checks with the amount as shown in the Japanese Navy Department budget.

Shape of the head of projectiles to be changed

Due to the increasing thickness of armor plates of ships it has been found that the present type of shells explode before piercing the armor plate, resulting in less damage. The Japanese Navy will change the shape and the quality of metal in the head of projectiles, and for this purpose the sum of ¥750,000 has been appropriated in the budget for the fiscal year 1926–27, under the item "Adoption of modern arms."

NOTE.—This checks with the amount as shown in the budget.

Improvement of fuses

The fuse heretofore used inside projectiles has been found to be too sensitive and leads to premature explosions, thereby causing less damage. These fuses are to be changed with a more slow-action fuse, so that the explosion will take place a few moments after striking. On the contrary, the detonator used to ignite the powder in the

guns has been found too slow, and this will be made more sensitive and powerful. For this purpose the sum of ¥350,000 has been appropriated in the budget for the fiscal year 1926–27, under the item "Adoption of modern arms."

NOTE.—This checks with amount as shown in the budget.

Japanese Navy aviation program

The navy aviation program called for an increase of 2½ companies in the fiscal year 1926–27, but the Diet appropriated for only one-half company. This one-half company is to be added to the Omura Naval Aviation Station.

The present strength of the Japanese aviation force, including the one-half company allowed for 1926–27, is as follows:

	Companies
Kasumigaura	6
Yokosuka	2½
Sasebo	2
Omura	1½
Hiro	½
Total	12½

The Japanese Navy Department has worked out a plan by which the aviation forces will be increased to 28 companies by the fiscal year 1931–32. Two and one-half companies will be added during the year 1927–28.

Japanese-designed airplane

A purely Japanese-designed airplane, No. 14 type, reconnoitering seaplane, which was designed and construction started four years ago at the Nagaura Ordnance Factory, has recently been completed, and orders for the construction of this type of plane have been placed with Nakajima Airplane Works, Ota Machi, Gumma Prefecture. When completed these machines will be sent to Kasumigaura and subjected to various tests, and if the results are favorable this plane will be adopted as a service plane and distributed to the various naval air stations and ships of the fleet.

The characteristics of the plane are as follows:

Motor, 400 horsepower. Japanese-made Lorraine Dietrich.
Width of plane, 17 meters.
Length of plane, 12 meters.
Height, 4 meters.
Lifting surface, 70 meters.
Weight of machine, 3,000 kilograms.
Speed, 90 knots.
Endurance, 12 hours.
Twin seater.

Ishikawajima Dockyard Co. to build airplane factory

The Ishikawajima Dockyard Co. will increase its capital from yen 1 million to yen 10 million and will branch out into the airplane business. The principal shareholders are Baron Shimusawa, Baron Okura, and other leading business men of Japan. A site to build an airplane factory is being looked for.

Japanese type planes of wooden and metal construction will be built, using the leading European machines as models.

Heretofore the Mitsubishi and Kawasaki Companies have supplied machines to the army, but in addition to the above companies the Ishikawajima will supply machines to the army. A retired army officer of the army aeronautic department, Lieut. Gen. Y. Arikawa, is to act in an advisory capacity.

Length of course in naval schools to be extended

The naval authorities have decided to extend the regular course of study at the naval academy, engineer school, and paymasters' school from 3 years to 3 years 8 months. The chief reason is that with the progress of science, arms and naval machinery have become more complex and elaborate in their workmanship and require greater skill on the part of those who work or manipulate them. The necessary expenditure involved will be asked for in the budget for the next fiscal year.

MEXICO

MISCELLANEOUS NOTES

[Source reliable]

Proposed training cruise

The companies of cadets from the naval school of Vera Cruz are going to undertake a voyage of study and courtesy, touching on their way various South American ports, on board the gunboat *Bravo*, having already commenced preparations for the voyage. The naval cadets will sail the Atlantic and Pacific, and afterwards will go to Europe, also on a training voyage.

Identification cards required of all visitors to Mexico

Effective April 1 of this year the Mexican Government will require that all persons visiting Mexico must present an identity card

with photograph of the bearer affixed thereon. These cards are issued by the local Mexican authorities without charge; the object being a means of identifying and checking up on all persons coming into Mexico for permanent residence or a temporary visit, and applies to all border residents well known as well as to strangers and tourists.

NETHERLANDS

NAVAL NOTE

The Dutch submarine *K–XIII* is scheduled to sail from The Helder May 27, 1926, commencing its voyage to the Dutch East Indies via Panama and San Francisco.

RUSSIA

NAVAL POLICY AND ORGANIZATION

Naval Policy

Russia's present naval policy calls for a force in the Baltic equal to the Baltic States, Finland, Sweden, and Germany; with a Black Sea Fleet as large as that existing in 1918.

To-day Russia (or the Soviet Union), comprising roughly one-seventh of the world's surface, with a population of 131,000,000 inhabitants, has for its western outlet to the sea a mere strip of some 200 miles of coast at the head of the Gulf of Finland. Through Latvia and Esthonia, with their ports of Riga and Reval pass, it has been stated, three-fourths of her imports.

Russia has never lost sight of the fact that upon her control of the Baltic depends to a large extent her prosperity, both political and economic; and she is mindful, too, that her stand as an exponent of world communism has made her the potential enemy, at least, of every capitalistic nation in the world.

The importance of Finland and Esthonia as naval bases for a country operating against Russia can hardly be overestimated; Finland in particular because of the Aland Islands, once owned by Russia, and, in view of their strategic location, the key to the Baltic, the Gulfs of Finland and Bothnia.

It has been held that for fear of losing their ships in the narrow and shallow waters of the Gulf of Finland, the force which Russia would have to face would not, it is likely, exceed her own.

In her recent building programs emphasis has been laid to destroyers and submarines, and the following conclusions arrived at

by Russian naval experts will, it is believed, show the reasons therefore:

1. The Finnish Gulf can be seized only by an active fleet, and in this operation the submarine fleet will be of secondary importance.

2. The isolation of the Baltic Entente can be carried out by submarines, but only after the seizure of the Finnish Gulf.

3. The fight against a fleet of the large Entente can be carried out by mining, by submarines and submarine destroyers, under the condition of a maximum of energy and efficiency.

Plans and programs.— It appears that the new naval program contemplates the building of 6 light cruisers, 12 destroyers, 6 gunboats, and 6 mine layers.

The old battleships, *Gangut* and *Poltava*, are being renovated and may be ready by the end of 1926.

There are rumors of gunboats for the Far East, and for the protection of Leningrad, it is reported that the Soviets have ordered 10 submarines and 15 coastal motor boats. The submarines being designed for cruising in the Gulf of Finland are to be of 130 tons, with a cruising radius of 200 to 300 miles, and are due for completion by the end of the year.

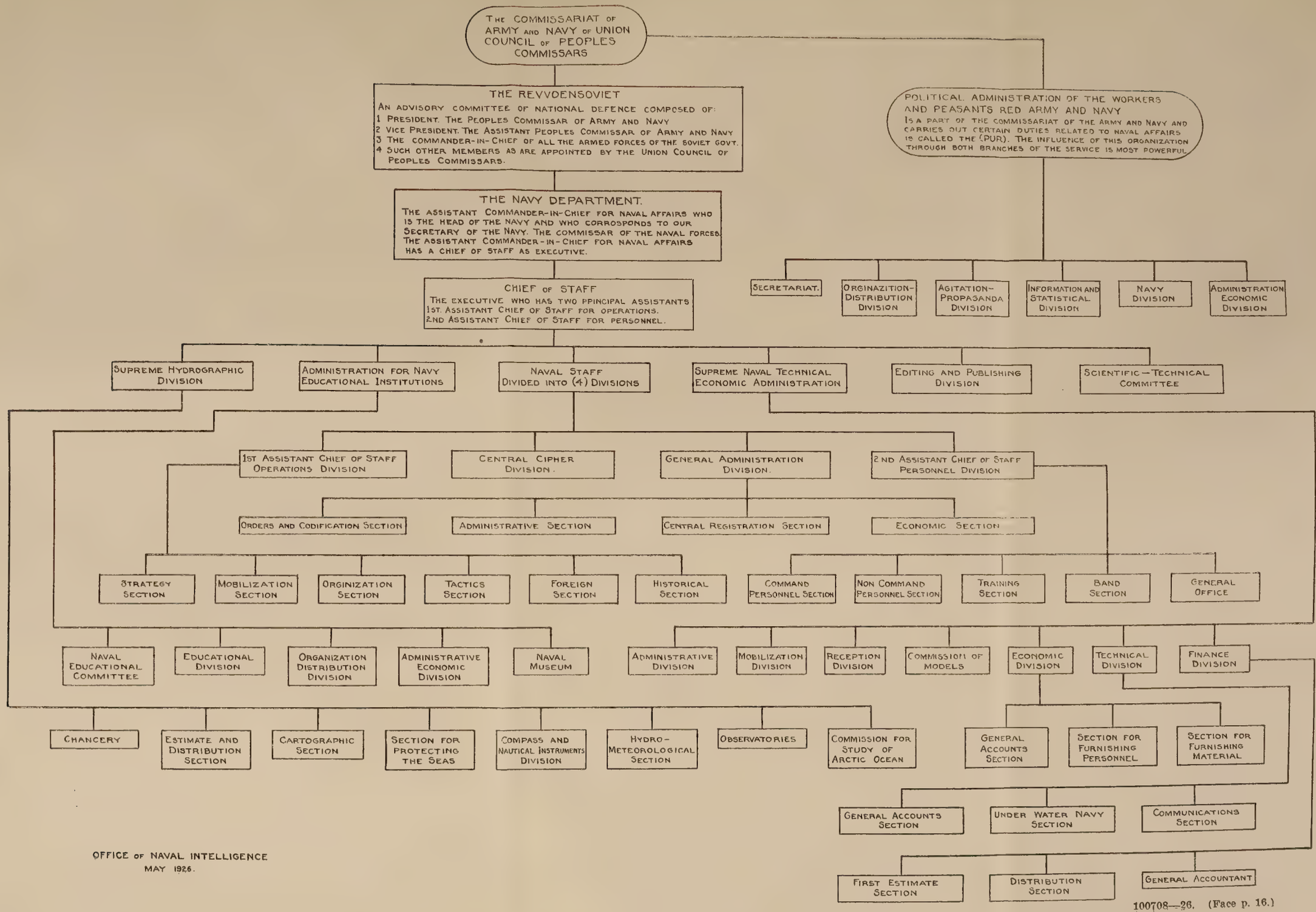
The Bizerta Fleet is still in French hands, and there are no news as to when, if ever, it will be turned over. It is a question as to how many of these ships could be used if they were returned to the Soviets, they are mostly in such a poor state of repair.

Submitted by the staff of the Black Sea Fleet is a scheme to establish a number of small coastal forts, bases and refuges for submarines, torpedo boats, and hydroplanes. These bases are to be located at Odessa, Tarkhankut, Yalta, Feodosia, Novorossisk, Gangri, and Batoum. The principal bases are to be at Novorossisk and Batoum and are to have two forts, the others but one, and it is proposed to install a 12-inch gun in each fort. This contemplates the protection by this series of forts of the entire coast from the Caucasus to the Crimea. Should the project not be adopted in its entirety, permanent bases will be established for air, submarines, and munition arsenals.

Russia's naval policy has, however, been hampered by Russian economic disaster, and for want of funds her programs, at the best, have only partially been carried out.

The Soviets seem to be keenly alive to the needs of the naval establishment, and are making some headway despite the handicap of lack of funds and the disorganization which has followed in the wake of communism. Their plans are quite ambitious; the fulfillment of them is, however, another matter.

THE ORGANIZATION OF THE SOVIET NAVY DEPARTMENT


THE COMMISSARIAT OF ARMY AND NAVY OF UNION COUNCIL OF PEOPLES COMMISSARS
THE REVVOENSOVIET
AN ADVISORY COMMITTEE OF NATIONAL DEFENCE COMPOSED OF:
1 PRESIDENT. THE PEOPLES COMMISSAR OF ARMY AND NAVY
2 VICE PRESIDENT. THE ASSISTANT PEOPLES COMMISSAR OF ARMY AND NAVY
3 THE COMMANDER-IN-CHIEF OF ALL THE ARMED FORCES OF THE SOVIET GOVT.
4 SUCH OTHER MEMBERS AS ARE APPOINTED BY THE UNION COUNCIL OF PEOPLES COMMISSARS.
POLITICAL ADMINISTRATION OF THE WORKERS AND PEASANTS RED ARMY AND NAVY
IS A PART OF THE COMMISSARIAT OF THE ARMY AND NAVY AND CARRIES OUT CERTAIN DUTIES RELATED TO NAVAL AFFAIRS IS CALLED THE (PUR). THE INFLUENCE OF THIS ORGANIZATION THROUGH BOTH BRANCHES OF THE SERVICE IS MOST POWERFUL
THE NAVY DEPARTMENT.
THE ASSISTANT COMMANDER-IN-CHIEF FOR NAVAL AFFAIRS WHO IS THE HEAD OF THE NAVY AND WHO CORROSPONDS TO OUR SECRETARY OF THE NAVY. THE COMMISSAR OF THE NAVAL FORCES. THE ASSISTANT COMMANDER-IN-CHIEF FOR NAVAL AFFAIRS HAS A CHIEF OF STAFF AS EXECUTIVE.
CHIEF OF STAFF
THE EXECUTIVE WHO HAS TWO PRINCIPAL ASSISTANTS
1ST. ASSISTANT CHIEF OF STAFF FOR OPERATIONS.
2ND ASSISTANT CHIEF OF STAFF FOR PERSONNEL.
SECRETARIAT.
ORGINAZITION-DISTRIBUTION DIVISION
AGITATION-PROPAGANDA DIVISION
INFORMATION AND STATISTICAL DIVISION
NAVY DIVISION
ADMINISTRATION ECONOMIC DIVISION
SUPREME HYDROGRAPHIC DIVISION
ADMINISTRATION FOR NAVY EDUCATIONAL INSTITUTIONS
NAVAL STAFF DIVIDED INTO (4) DIVISIONS
SUPREME NAVAL TECHNICAL ECONOMIC ADMINISTRATION
EDITING AND PUBLISHING DIVISION
SCIENTIFIC—TECHNICAL COMMITTEE
1ST ASSISTANT CHIEF OF STAFF OPERATIONS DIVISION
CENTRAL CIPHER DIVISION.
GENERAL ADMINISTRATION DIVISION.
2ND ASSISTANT CHIEF OF STAFF PERSONNEL DIVISION
ORDERS AND CODIFICATION SECTION
ADMINISTRATIVE SECTION
CENTRAL REGISTRATION SECTION
ECONOMIC SECTION
STRATEGY SECTION
MOBILIZATION SECTION
ORGINIZATION SECTION
TACTICS SECTION
FOREIGN SECTION
HISTORICAL SECTION
COMMAND PERSONNEL SECTION
NON COMMAND PERSONNEL SECTION
TRAINING SECTION
BAND SECTION
GENERAL OFFICE
NAVAL EDUCATIONAL COMMITTEE
EDUCATIONAL DIVISION
ORGANIZATION DISTRIBUTION DIVISION
ADMINISTRATIVE ECONOMIC DIVISION
NAVAL MUSEUM
ADMINISTRATIVE DIVISION
MOBILIZATION DIVISION
RECEPTION DIVISION
COMMISSION OF MODELS
ECONOMIC DIVISION
TECHNICAL DIVISION
FINANCE DIVISION
CHANCERY
ESTIMATE AND DISTRIBUTION SECTION
CARTOGRAPHIC SECTION
SECTION FOR PROTECTING THE SEAS
COMPASS AND NAUTICAL INSTRUMENTS DIVISION
HYDRO-METEOROLOGICAL SECTION
OBSERVATORIES
COMMISSION FOR STUDY OF ARCTIC OCEAN
GENERAL ACCOUNTS SECTION
SECTION FOR FURNISHING PERSONNEL
SECTION FOR FURNISHING MATERIAL
GENERAL ACCOUNTS SECTION
UNDER WATER NAVY SECTION
COMMUNICATIONS SECTION
FIRST ESTIMATE SECTION
DISTRIBUTION SECTION
GENERAL ACCOUNTANT

OFFICE OF NAVAL INTELLIGENCE
MAY 1926.

100708—26. (Face p. 16.)

Organization

[See diagram]

For external defense the armed forces of the Soviet Government have been placed under one head, who has been designated as "The Commander in Chief of All the Armed Forces of the Union."

Under his orders and at the head of the navy department functions an official known as "The assistant commander in chief for naval affairs."

The supreme organ of authority in the Soviet Government is the Union Congress of Soviets, which meets once a year. In its absence it is replaced by the central executive committee, which meets four times a year. The central executive committee between sessions is replaced by its presidium of 27 members. The central executive committee and, therefore, this presidium is further controlled by the political bureau of the Russian Communist Party, a body numbering nine members and five alternates.

A bare outline of the Government has been given to show the handful of men that really control Russia's destiny.

To revert to the Union Congress of Soviets. In military affairs this body has cognizance of the following activities:

I. The declaration of war.

II. The approval of the budget.

III. The organization and control of the armed forces of the union.

A step lower than and responsible to the central executive committee which controls it comes the union council of people's commissars.

The council of commissars has nine commissariats, five federal and four combined, each headed by its commissar, and the commissariat which handles the armed forces of the Union is the commissariat of the army and navy, having under its cognizance some of the following activities:

(*a*) The drawing up and execution of plans and measures for national defense.

(*b*) The organization of the military and naval forces of the Union.

(*c*) Registration and calling up for military service; the training and preparing for war of the red army and the red navy.

(*d*) The preparatory military training and athletic training on military lines of all young men who do not enter the army or navy.

(*e*) The political and general training of the military personnel of the army and navy.

(*f*) The means of communication of the Union for military and naval purposes.

Every commissariat has what is known as a collegium. This collegium is the executive branch of the department. For the commissariat of army and navy the collegium is called the revvoensoviet (revolutionary military soviet): in reality it is an advisory committee of national defense.

Responsible to the revvoensoviet, a step lower and headed by the assistant commander in chief for naval affairs, comes the navy department.

The trend of authority so far runs thus:

The navy department is responsible to the revvoensoviet, on which committee sits the commander in chief.

The revvoensoviet is part of the commissariat of army and navy.

The commissariat of army and navy is controlled by the union council of people's commissars, which is in turn controlled by the central executive committee of the Union.

The central executive committee, or in its absence its presidium of 27 members, really runs the Government, since the Union Congress of Soviets meets but once a year.

Back of all, however, is the control of the central executive committee by the political bureau of the all union (formerly Russian) communist party. Hence its shadowy control of the Government and the armed forces of the land.

The council of labor and defense.—To coordinate the activities of all the departments of State in the interests of defense and economic reconstruction, there is what is known as a council of labor and defense. Its decisions are binding on all institutions, central and local, and may be set aside only by the central executive committee or by the union council of people's commissars.

The navy department.—The navy department has charge of all naval matters relating to the defense of the Union.

At its head is the assistant commander in chief for naval affairs, with his chief of staff, and two assistant chiefs of staff, one for operations and one for personnel.

The Russian Navy Department is, it would seem, divided into six principal establishments as follows:

The naval staff.

The supreme naval technical-economic administration.

The administration for navy educational institutions.

The supreme hydrographic divsion.

The editing and publishing division.

The scientific technical committee.

The naval staff.—The naval staff is divided into an operations, a personnel, central cipher, and general administration division:

(*a*) The operations division handles questions of naval defense, of the organization of the fleets, and shore stations, also matters concerning the tactical utilization of armament and equipment.

(*b*) The personnel division (called curiously by the Russians the construction division) takes care of the personnel of the fleets and the navy department, and is concerned also with questions of service and living conditions. Enlistment records, classification, training, etc., come under this division.

(*c*) The central cipher division instructs and inspects the fleets for cipher work, codes, and decodes messages.

(*d*) The general administration division would appear to be as its name implies the administrative or head office of the naval staff, with its four sections: Administrative, orders and codification, central registration, and economic.

The supreme naval technical-economic administration.—There are 16 divisions and subdivisions to this branch of the navy department. The functions of some are as follows:

(*a*) The technical division of this branch is concerned with the construction of and repairs to war vessels, also the furnishing of military supplies to the fleets.

(*b*) The economic division carries out the preparation at the center and the distribution, through the appropriate local organs of the fleet and naval commissariats for ships and shore institutions, all kinds of stores, foodstuffs, material (equipment), etc.

(*c*) The finance division handles the financial operations of the entire navy department.

(*d*) In addition, there are directly subordinate to the chief of the supreme naval technical-economic administration; naval ports (in technical respects), also the following independent institutions:

(*a*) The commission of naval artillery experiments.

(*b*) The naval ordnance grounds.

(*c*) The scientific-technical laboratory of the navy department.

(*d*) The experimental shipbuilding basin.

(*e*) The commission of inspection of ship construction at Nikolaiev.

(*f*) The representative attached to the local collection offices of the people's commissariat of ways and communication.

(*g*) The central garage.

(*h*) The central storehouse in Moscow.

(*i*) The mine and artillery storehouses of the naval commissariat in Nizhny Novgorod and Tver.

(*j*) Storehouses in Rybinsk and Kolomna.

(*k*) The storehouses in Archangel and Nikolaiev.

The administration for naval educational institutions.—Concerned with the following activities:

(*a*) The drawing up of educational programs, physical and mental, for naval educational institutions.

(*b*) Supplying these institutions with their teaching staffs and students.

(*c*) Observance of the progress of instruction in the lower educational institutions.

(*d*) The supreme special courses of the commanding personnel of the fleets.

(*e*) The naval school.

(*f*) The naval engineer school.

(*g*) The naval preparatory school.

At the head of the administration of naval educational institutions is the chief of the administration, who is the chief of the naval educational institutions.

Subordinate to the chief of the administration are (*a*) in all respects all naval educational institutions of the commanding personnel except the naval academy; (*b*) as concerns instruction, all schools of specialists not of the commanding staff of the fleet; (*c*) as concerns construction and management, the naval political courses.

The supreme hydrographic division.—This organization takes care of the safe navigation of all the seas of the Soviet Union, the direction of scientific, investigational, and hydrographic work.

In particular it is charged with:

(*a*) The working out of specification plans for the guarding of supposed theaters of war and the execution of these plans.

(*b*) The carrying out of hydrographic investigations on the seas of the Soviet Union.

(*c*) The observance of the correctness of navigation reports ("navigationny journali").

(*d*) The compiling of naval maps and sailing directions.

(*e*) The preparation and acquisition of nautical articles for the supply of the fleet.

(*f*) The organization of naval astronomical, hydrometeorological, compass observatories and stations.

(*g*) The organization of rescue stations.

(*h*) The regulation of pilot matters.

The editing and publishing division.—Edits, publishes, and distributes naval literature; in addition has charge of the publishing office of the navy department in Leningrad, the navy department bookstore and storehouse attached.

The scientific technical committee.—This body studies questions of naval tactics and technique.

Fleet organization.—The fleets of the Soviet Union are:

(*a*) The Baltic.

(*b*) The Black Sea.

(*c*) The Caspian and Volga Flotilla.

(*d*) The Amur Flotilla.

At the head of each fleet is either (*a*) the revolutionary military soviet of the given fleet, consisting of the chief of the naval forces

and the member of the revolutionary military soviet of that fleet, or (*b*) the chief of the naval forces of the given fleet and a commissar.

The staff of the naval forces of any fleet, headed by the chief of the naval forces and the commissar, is the executive organ of command of the fleet.

A report of March 9 would seem to indicate, however, that the authority of the commissars is to a certain extent passing away. "Absolute authority of command has been returned to the naval commanders, after example of the army; they have ceased to be subject to the authority of the commissars."

Shore establishments, bases, and coast defenses.—The principal naval bases are: Leningrad, Kronstadt, Sevastopol, Odessa, Nikolaieff, Novorossisk.

There are other minor bases, and plans are being projected for a chain of small fortified naval bases in the Black Sea.

Coast defenses.—Leningrad is protected by the fortifications at Kronstadt. These are probably the most modern that Russia possesses.

For the Black and Azov Seas, Sevastopol is the headquarters. This fort is well fortified. The Crimea is defended by about 90 guns of all calibers.

The Odessa area has numerous batteries of calibers varying from 3 to 8 inches, and at Novorossisk there are three batteries with two 10-inch and eight 6-inch guns.

Reliance is placed on the navy and existing coast defenses backed by strong mobile forces and some railway artillery. There is, however, a lack of cooperation between the army and navy.

Strength.—The personnel of the navy numbers about 45,000, according to latest report, and replacements for the fleet are made by the communist society of young men.

The Soviet Navy

Battleships	5
Cruisers	7
Aircraft carriers	1
Destroyers	83
Submarines	23
Sloops	4
Coastal motor boats	27
Gunboats and dispatch vessels	2
River gunboats	4
Mine sweepers	20
Grand total	176

Of this total many ships are laid up for want of repairs, many are obsolete, and as far as value goes exist in name only.

Distribution.—The League of Nations Year Book for 1926 lists the Russian Navy as follows:

Baltic Fleet

Battleships	2
Cruisers	3
Destroyers	13
Submarines	9
Miscellaneous, different units (gunboats, armored gunboats, mine layers)	40

Black Sea Fleet

Cruisers	2
Destroyers	3
Torpedo boats	3
Submarines	4
Miscellaneous, different units (gunboats, sloops, etc., including 4 destroyers and other units of Caspian and Volga and Amur Flotillas)	18

Naval aviation.—It is reported that on December 1, 1925, the Russian air force possessed 160 seaplanes of various types, that of these 60 machines organized into 12 squadrons are stationed on the White Sea, and that at present the air fleet for the Caspian Sea is in course of organization.

Russia of late has paid a great deal of attention to this arm of warfare.

The political administration of the workers' and peasants' red army and navy.—No story of the navy would be complete without mention of this organization, which is a part of the commissariat of army and navy, and carries on the political-educational work in the fleet, directing the activities of the clubs, and exercising a most important influence over both branches of the service.

Efficiency.—The Russian Navy is not efficient. The personnel, officer and enlisted, is neither well trained nor well disciplined.

Some progress has, however, been made toward reconstruction under the energetic leadership of Soff, the commander in chief.

The programs that have been laid down have only been partially carried out.

The framework for an efficient navy exists. It remains to be seen whether or not it can emerge from the hopeless state into which it has been allowed to fall.

The merchant marine.—The tale of Russia's Navy, and, in fact, her economic life, is the tale of her merchant marine.

At the beginning of 1925 the merchant fleet of the Soviet Union consisted of 272 steamships and oil burners, with a freight capacity of 322,016 tons, and 365 sailing vessels, with a freight capacity of 84,226 tons, as well as an auxiliary fleet of 925 small vessels.

These figures include approximately 141 merchant steamers of 500 tons and above; of these one can make 15 knots, two 13½ knots, and one 13 knots, the others are under 12 knots.

Early in 1925 a five-year building program was adopted for the construction of 228 vessels of various types, with a combined dead-weight tonnage of 819,240 tons. This program was to cost $68,000,000,000.

During 1925–26, 30 of these vessels are under construction.

Conclusion

Russia's Navy has shared the fate of her industry, and reconstruction in every field of endeavor is what the country needs to-day. Unfortunately for her, this same reconstruction can not take place in any appreciable degree without outside assistance.

The help she needs is not forthcoming and will in all likelihood be withheld until the Soviets give ample evidence that they are willing to conform to the standards set by other old and established nations in their intercourse one with another.

When this change does come, as come it will some day, it will bring to the fore Russia's old urge for the control of the Baltic.

This unexpressed thought is probably behind all of her building programs, and will grow the stronger and more imperative in proportion to the increasing importance she takes among the brotherhood of nations.

RUSSIA

MILITARY SERVICE

The new law for military service was published on October 23, 1925, and entered into effect on November 1. It does not contain any material innovations, being practically nothing more than a résumé of the various regulations issued in the course of the last years.

Its fundamental principle is that of obligatory military service for all able-bodied men. In war time women are also subject to obligatory service; in peace time they may enter the army as volunteers on the same principles as male volunteers.

The second fundamental principle consists in the preeminence accorded to active armed service, which is only recruited among the working classes and the politically reliable elements of the population. The "bourgeois" and the politically unreliable elements are not allowed to carry arms and are obliged to do their service, both in

war and peace time, in the rear "working formations." Owing to the restricted number of these formations in peace time, the surplus recruits are released from service, instead of which they are subject to the payment of a military tax. Members of certain religious sects are freed from military service.

Release from service or alleviations of the same are granted on the ground of particularly adverse domestic conditions, in which case the men are classed into different categories, according to which they are either completely or partially released. Students of higher schools are allowed a shorter term of service, like the former German "Einjaehrige."

The term of military service is 21 years, from the age of 19 to 40. It consists of three periods: (1) Preliminary training, (2) active service, (3) reserve service.

Preliminary service is obligatory from the age of 19 to 21, during four weeks in every year. The military training practiced in youthful organizations before that age is not included under the head of military service.

Active service begins at the age of 21. It covers a term of five years including the leave of absence periods. The respective length of the actual service and the leaves of absence varies according to the class of arms and the section of the army—whether regular army or territorial division.

In the regular army the term of actual service is four years, three years in the air service and special duties such as military clerks, smiths (for horse shoeing), etc., and two years in all the other classes of arms.

In the territorial divisions the term of actual service is eight months in the infantry and twelve months in the other divisions. A three months term is obligatory in the first year, the remaining term is distributed over the next four years, but not more than two months a year.

If the yearly recruit quota is complete, the surplus recruits instead of being enrolled into active service are submitted to six months of military training which is distributed over the five years so as not to exceed two months in every year.

The students of higher schools are privileged to a shortened term of service. They only need to serve one year, in the course of which they are trained as subaltern leaders. At the end of the year they must pass an examination which qualifies them for the rank of subaltern leaders; if they succeed, they are transferred into the reserve; if not, they pass into the ordinary category of recruits and have to go through four more years of service.

Volunteers are allowed to enter the army from the age of 16.

Having terminated their five years of active service, the recruits pass into the reserve, which is divided into two categories; the first from the age of 28 to 34, and the second from 34 to 40.

Reservists are required to attend military drill for three months and the leaders for twelve months during their six years of service.

The raising of recruits is supervisioned by the territorial formations and the civil authorities, or by these alone in districts where the territorial system has not yet been established.

The soldiers are recruited and released in the autumn.

With regard to their functions, the category of the leaders is subdivided into sections: Commanding, political, administrative, medical, and veterinary; with regard to rank, it is divided into the youngest, medium, older, and highest classes.

The youngest class is supplied by soldiers who are trained in the regimental schools. They can serve their term as ordinary soldiers or they can stay on and serve up to their 35th year.

The three remaining classes are supplied by recruits who have finished a middle or a higher military school. The length of their term depends upon their capacities and the requirements of the Government; it is limited by the age of 50. After finishing their term, they may pass into the reserve where the age limit is 55 for the older leaders and 60 for the highest leaders.

The new law is obviously inspired by the desire to utilize all the resources in human material for the organization of national defense. The very short term of actual service in the territorial divisions will probably prove to be a mistake and it seems likely that this point of the regulations will have to be altered.

The Soviet Government proposes to issue new regulations for the introduction of obligatory military drill in all the higher schools. Beginning from the autumn of 1925, all the students of these schools will be required to spend three months every year in military training camps. The same measure will be applied to middle schools as well.

UNITED STATES

DESTROYER LEADERS OF PRINCIPAL NAVIES, MAY, 1926

[Source O. N. I.]

United States

Built ..... None.
Building ..... None.

Great Britain

Name	Displacement	Speed	Main battery	Secondary battery	Antiaircraft guns	Torpedo tubes		Completed
						Submerged	Above water	
	Tons	*Knots*						
Campbell	1,800	36.5	5–4.7 inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1918
Mackay	1,800	36.5	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1919
Malcolm	1,800	36.5	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1919
Montrose	1,800	36.5	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1918
Stuart	1,800	36.5	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1918
Bruce	1,800	36.5	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1918
Douglas	1,800	36.5	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1918
Wallace	1,750	36	5–4.7-inch	5 machine guns	1–3-inch		2 triple	1919
Shakespeare	1,750	36	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1917
Spenser	1,750	36	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1917
Seymour	1,670	34	4–4-inch	7–2 pounder and machine guns.			2 double	1916
Saumarez	1,670	34	4–4-inch	7–2 pounder and machine guns.			2 double	1916
Grenville	1,670	34	4–4-inch	7–2 pounder and machine guns.			2 double	1916
Abdiel	1,670	34	3–4-inch	6–2 pounder and machine guns.	40–60 mines			1916
Anzac	1,670	34	4–4-inch	7–2 pounder and machine guns.			2 double	1917
Broke	1,750	36	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1925
Keppel	1,750	36	5–4.7-inch	7–2 pounder and machine guns.	1–3-inch		2 triple	1925

Total, 17,129,700 tons displacement.
Building, none.

Japan

Japan has 20 new destroyers authorized, of which 4 are now building; 1,800 tons displacement, high speed, and large radius. While these boats are not called destroyer leaders (Japan now uses light cruisers for this duty), they have all the physical characteristics of the so-called leaders of other navies.

France

BUILT

Name	Displacement	Speed	Main battery	Secondary battery	Antiaircraft guns	Torpedo tubes		Completed
						Submerged	Above water	
	Tons	*Knots*						
Admiral Senes	2,067	34	4–5.9 inch		4 machine guns.		2 double 23.6 inch.	1918

France—Continued

BUILDING AND DATE OF LAUNCHING

Name	Displacement	Speed	Main battery	Secondary battery	Antiaircraft guns	Torpedo tubes		Completed
						Submerged	Above water	
	Tons	*Knots*						
Jaguar	2,359	35.5	5–5.1		2–2.9 inch		2 tripple 21.7 inch.	Mar. 7, 1925
Panthere	2,359	35.5	5–5.1		2–2.9 inch		2 tripple 21.7 inch.	Oct. 27, 1925
Chacal	2,359	35.5	5–5.1		2–2.9 inch		2 tripple 21.7 inch.	Mar. 7, 1925
Leopard	2,359	35.5	5–5.1		2–2.9 inch		2 tripple 21.7 inch.	Do.
Lynx	2,359	35.5	5–5.1		2–2.9 inch		2 tripple 21.7 inch.	Feb. 25, 1925
Tigre	2,359	35.5	5–5.1		2–2.9 inch		2 tripple 21.7 inch.	Mar. 7, 1925
Guepard	2,400	37	Building at Lorient.					
Bison	2,400	37	do					

Total, 9; 21,021 tons displacement.

AUTHORIZED AND APPROPRIATED FOR

Lion	2,400	37	Contract not placed			

Italy

BUILT

Name	Displacement	Speed	Main battery	Secondary battery	Antiaircraft guns	Fuel	Torpedo tubes	Completed
	Tons	*Knots*						
Leone	2,165	35	8–4.7 inch	60 mines	2–3 inch	Oil	2 triple	1924
Pantera	2,165	35	8–4.7 inch	60 mines	2–3 inch	Oil	2 triple	1924
Tigre	2,165	35	8–4.7 inch	60 mines	2–3 inch	Oil	2 triple	1924
Premuda	2,290	35	4–5.9 inch	Machine guns	2–14 pounder	Oil	2 double	1919
Carlo Mirabello	1,521	35	8–4 inch	Machine guns (100 mines).	2–2 pounder	Oil	2 double	1916
Agusto Riboty	1,521	35	8–4 inch	do	2–2 pounder	Oil	2 double	1916
Aquila	1,531	35	4–4.7 inch	4–14 pounder (50 mines).	2–2 pounder	Oil	2 double	1916
Falco	1,531	35	5–4.7 inch	do	2–2 pounder	Oil	2 double	1919

Total, 8; displacement 14,889 tons.
Building, none.

Spain

BUILDING

Name	Displacement	Speed
	Tons	*Knots*
Churruca	1,650	36
Sanchez Barcaiztegui	1,650	36
Alcala Galiano	1,650	36

Total, 3; 4,950 tons displacement.

Chile

Name	Laid down	Displacement	Armament	Horsepower	Speed	Fuel	Torpedo tubes
		Tons			*Knots*		
Almirante Williams	1911–1915	1,742	2–4.7 inch	30,000	31.5	Crude oil	2 double 21 inch
Almirante Riveros	1911–1915	1,694	2–4 inch	30,000	31.5	do	4 single 21 inch
Almirante Uribe	1911–1915	1,704	2–2 pounder	30,000	31.5	do	4 single 21 inch

Total, 3; 5,140 tons displacement.

Russia

A recent report states that the Russian Admiralty has decided to order a number of 2,200-ton destroyer leaders from Italian yards. The inference is that these are to be similar to the Italian *Leone* type, which are also of 2,200-ton displacement, with a speed of 34 knots.

Summary

WORLD DESTROYER LEADERS

Countries	Built	Building
United States		
Great Britain	18	
Japan		4
France	6	[1]3
Italy	8	
Spain	3	
Chile	3	
Russia		(?)

[1] One appropriated for but contract not placed.

UNITED STATES

AMERICAN AND BRITISH OIL RESOURCES AND POLICIES

[Source, O. N. I.]

In undertaking this subject it is much easier to state the resources of the two nations than it is to analyze their policies. Possibly by an analysis of the resources the policies, or lack thereof, unfold themselves.

In any event, by stating the facts as they are, a certain general understanding of the situation in the two countries as regards oil can be gathered.

In describing the oil resources of the two nations it is necessary to divide the subject up into its component parts and describe each one separately. The component parts, or major operations, in connection with the oil industry are (assuming that there is sufficient financial backing for the operations): First, Production, or getting the oil out of the ground; second, Transportation, or carrying the oil to the localities where it is to be refined, stored, or distributed; third, Marketing, which includes selling, distribution, and storage; and fourth, Consumption. Refining is not discussed, as it is not thought to have sufficient bearing on the subject of comparison between the two countries.

I. Production

(See attached table on world production)

By far the most important of the major operations in the oil industry is production, for without production the other operations cease.

WORLD PRODUCTION TABLE

ANALYSIS OF WORLD CRUDE OIL PRODUCTION FOR 1924 SHOWING COMPARISON OF STANDARD OIL AND INDEPENDENT AMERICAN CONCERNS WITH ROYAL DUTCH-SHELL, ANGLO-PERSIAN-BURMA OIL CO. GROUP AND INDEPENDENT BRITISH CONCERNS.

NAME OF OIL PRODUCING COUNTRY	PRODUCTION UNDER AMERICAN CONTROL. STANDARD OIL GROUP	PRODUCTION UNDER AMERICAN CONTROL. INDEPENDENT AMERICAN PRODUCERS	PRODUCTION UNDER BRITISH CONTROL. ROYAL DUTCH SHELL GROUP (a)	PRODUCTION UNDER BRITISH CONTROL. ANGLO-PERSIAN AND BURMA OIL CO. GROUP (b)	PRODUCTION UNDER BRITISH CONTROL. INDEPENDENT BRITISH PRODUCERS	TOTAL OIL PRODUCED IN COUNTRY.	PERCENTAGE OF WORLD TOTAL
UNITED STATES	145,495,383 bbls.	521,586,907 bbls.	45,556,187 bbls.	none.	1,301,523 bbls.	713,940,000 bbls.	70.5
MEXICO	29,330,861 "	83,000,000 " (approx)	23,692,939 "	"	313,814 "	139,497,000 "	13.8
RUSSIA	none.	none.	none.	"	none.	45,312,000 "	4.5
PERSIA	"	"	"	32,373,000 bbls.	"	32,373,000 "	3.2
DUTCH EAST INDIES	602,617 "	"	19,870,383 "	none.	"	20,473,000 "	2.0
ROUMANIA	1,174,177 "	"	3,269,735	"	3,431,097 "	13,303,000 "	1.3
VENEZUELA	none.	No figures.	7,337,574 "	"	1,023,383 "	8,754,000 "	.9
INDIA	"	none.	none.	8,150,000 "	none.	8,150,000 "	.8
PERU	6,476,661 "	"	"	none.	1,334,064 "	7,812,000 "	.8
POLAND	Very small	"	"	No figures.	No.figures.	5,657,000 "	.5
ARGENTINA	" "	-	-	Very small	-	4,669,000 "	.4
BRITISH BORNEO	none.	none.	4,163,000 "	none.	none.	4,163,000 "	.4
TRINIDAD	"	"	372,643 "	"	3,684,357 "	4,057,000 "	.4
JAPAN AND TAIWAN	-	-	-	-	-	1,959,000 "	.2
EGYPT	none.	none.	1,122,000 "	none.	none.	1,122,000 "	
COLOMBIA	445,000 "	"	none.	"	"	445,000 "	
FRANCE	-	-	-	-	-	426,000 "	
GERMANY	-	-	-	-	-	406,000 "	
CANADA	Small. No figures.	none.	Small. No figures	none.	Small. No figures.	164,000 "	
CZECHOSLOVAKIA	-	-	-	-	-	75,000 "	
ITALY	-	-	-	-	-	45,000 "	.3
ALGERIA	-	-	-	-	-	12,000 "	
BARBADOS	-	-	-	-	-	10,000 "	
CUBA	-	-	-	-	-	4,000 "	
ENGLAND	-	-	-	-	-	2,000 "	
OTHERS	-	-	-	-	-	97,000 "	
TOTAL	183,524,699 bbls.	604,586,907 bbls.	105,384,461 bbls.	40,523,000 bbls.	11,088,238 bbls.	1,012,927,000 "	100

788,111,606 bbls

156,995,699 bbls.

	945,107,305 bbls.
Production by countries where there is neither British nor American control	67,819,695 bbls.
TOTAL WORLD 1924	1,012,927,000 bbls.

(a).. Officially, the stock of the Royal Dutch Shell combine is said to be owned in the proportion 60% Dutch and 40% British. However, a study of the Royal Dutch Shell combine will convince almost anyone that the control and administration of the Co. is largely British and for the pruposes of this table it is assumed to be British controlled.

(b).. Fifty-one percent of the stock of the Anglo-Persian Co. is owned by the British Admiralty. The Burmah Oil Co. owns a large portion of stock in the Anglo-Persian Co.

In discussing production, statistics for the year ending December 31, 1924, are used, as it is the latest year for which complete statistics all over the world are available.

During the year 1924 the world produced 1,012,927,000 barrels of crude oil. Of that amount 713,940,000, or 70.5 per cent, was produced in the United States, and of the remainder only 16,500,000 barrels, or less than 1.6 per cent, was produced within the actual confines of the British Empire.

However, by virtue of a very definite policy, both governmental and private, the British Empire has managed to control production in foreign countries to such an extent that in the same year British-controlled production throughout the world was 157,000,000 barrels, or 15½ per cent of the total. It will be interesting to note that of the 157,000,000-barrel production under British-controlled companies, approximately 47,000,000, or about 30 per cent, was produced in the United States.

In using the term "British-controlled companies," that gigantic organization known throughout the world as the Royal Dutch Shell combine is considered British. Although the stock in this company is officially stated to be held in the proportion 60 per cent Dutch and 40 per cent British, anyone who studies the activities of this concern will realize that it is British controlled and administered. There is no doubt of the fact that in case of a war involving the British Empire the resources of this company would be placed at the disposal of the British Government.

Going back again to world production, it is most interesting to note that of the entire world production in 1924, 329,432,160, or 32.5 per cent, was produced by the three most important oil groups in the world—the Standard Oil Group (American), the Royal Dutch Shell Group (British), and the Anglo-Persian-Burmah Oil Group (British).

In calling the above groups the three most important in the world, all factors of the oil industry have been taken into consideration, and there is no doubt that those three are the most important from an international standpoint. There are two or three independent American companies which undoubtedly produce more oil than the Anglo-Persian-Burmah Oil Group, but production is not the only factor to be taken into account in judging relative values from an international standpoint.

The Standard Oil, undoubtedly, is the most important of the three because of its control of vast natural oil-producing properties, the wealth invested in it, and its gigantic organization.

In 1924 this group, through its subsidiaries and affiliated companies, produced approximately 184,000,000 barrels (18 per cent of

the world total), and this does not include an immense amount of oil purchased from independent American concerns.

Of the 184,000,000 barrels produced by this gruop, 145,000,000 was produced in the United States and about 30,000,000 in Mexico. Since January 1, 1925, the Standard Oil Group has obtained control of some of the largest independent American concerns, some of whom have subsidiary companies in Mexico and South America, so that at the present time Standard Oil is a more powerful factor in the oil industry than it was at the end of 1924.

The Royal Dutch Shell combine is probably the next most powerful oil combine in the industry, both from the production side and from the fact that it holds concessions in all of the present known oil pools of the world, except Russia, Persia, and India (Burma).

If the time ever comes when the United States loses its place as premier oil producer of the world, the Royal Dutch Shell will have the throttle hold on the oil industry. This group has more present and potential oil-producing concessions in oil pools of the world than has the Standard Oil, but, of course, the latter with its vast resources at its back door has the bulge on anybody else now.

However, "in time of peace prepare for war," and that is just what the Royal Dutch-Shell are doing.

The third, and by no means the most insignificant oil group, is the Anglo-Persian-Burmah Oil Co.

The British Admiralty owns 51 per cent of stock in the Anglo-Persian Co. and consequently controls its policy. It is the nearest to a Government-owned oil company that there is in the world—at least, of any importance. The Burmah Oil Co. owns a large block of stock in the Anglo-Persian Co., and it is difficult to distinguish the line of demarcation between the two companies.

This group produced some 40,000,000 barrels of oil in 1924, principally from the Persian fields of the Anglo-Persian and from the Burmah fields of the Burmah Oil Co. In regard to the Persian fields it has been reliably reported that the Anglo-Persian Co. could easily speed up its annual production of about 32,000,000 to 70,000,000 if there were sufficient facilities for handling it.

The last group of important producers at the present time are the independent American companies who, in 1924, produced some 520,000,000 barrels of oil in the United States and approximately 83,000,000 barrels in Mexico. Three or four of these stand away ahead of the rest as regards production and distribution, but none of them can be considered as important as the Standard Oil Group when all features of the industry are taken into consideration.

In order to fully understand the production features of the industry it is necessary to take each of the oil-producing countries sep-

arately and give a brief summary of the present and potential production.

United States

The United States is unquestionably away ahead of all other countries at present as regards production.

Varying reports give estimates of from five to fifty years as the probable life of the oil fields of the United States. Nobody knows, but it is known that there is an end to all things, and the enormous increase in consumption in recent years compared with the much less rapid increase in production would give much food for thought and speculation for the future.

If the day ever comes when production can not keep up to consumption it will be entirely a question of how much of a reserve supply is available. Then, when the reserve is used up, look out for radical changes in American industry.

United States production in 1924 was 713,940,000 barrels (70.5 per cent of the world total) of which about 667,000,000 was produced by American controlled companies, and the rest by British controlled companies. Of the latter production, all but 1,300,000 was produced by Royal Dutch Shell subsidiaries.

Mexico

Mexico produced 139,497,000 barrels in 1924, which was 13.8 per cent of the world total and placed her second in the standing of oil producing nations of the world.

This was less than the 1923 production and the estimates for 1925 are about 20,000,000 less than 1924.

The decline in Mexican production is due to three causes: First, the exhaustion of some of the big wells; second, the increasing difficulty of piping and transporting of crude oil from the producing wells, which are moving farther inland, to the shipping ports; and lastly, to the lack of desire of foreign countries to invest money in Mexican industries due to the unstable conditions. Of the total amount produced in 1924 American interests produced about 80 per cent and British about 17 per cent.

Russia

In 1924 Russia produced 45,000,000 barrels, or 4½ per cent of the world's total. There are assumed to be vast oil pools in Russia as yet untouched, but owing to the present unfavorable political conditions there it is doubtful if any great amount of foreign capital will be invested in the oil industry unless conditions change.

Russia can not finance the proposition herself nor do the Russians seem to have the ability or ingenuity to get the oil out themselves.

There are no British or American producing companies at present in Russia.

Persia

Persia produced 32,373,000 barrels in 1924, or 3.2 per cent of the world total.

All oil produced in Persia is by the Anglo-Persian Oil Co., which has the sole oil concession for Persia, except for five Provinces on the Caspian Sea which are not yet prospected. As was stated before, the Persian production can be increased to 70,000,000 barrels annually whenever necessary.

Bear in mind that this company is 51 per cent owned by the British Admiralty.

In Iraq, just over the Persian border, is another important potential oil supply. This is discussed under Mosul. There are no American companies in Persia.

Dutch East Indies

The Dutch East Indies produced 20,473,000 barrels (2.0 per cent of world total) in 1924.

Nearly all of this production (about 97 per cent) was produced by Royal Dutch Shell interests.

The Standard Oil has a subsidiary company producing here, but it is not likely to make any great headway against the Royal Dutch Shell interests.

Rumania

Rumania produced 13,303,000 barrels in 1924 (1.3 per cent of world total). The Standard Oil, Royal Dutch Shell, and British independent companies are operating in Rumania.

Venezuela

Venezuela produced 8,754,000 barrels, or 0.9 of one per cent of the world total. The estimate for 1925 is about 20,000,000 barrels and at the rate things are going in 1926, the total for this year will be a great deal more than the 1925 estimate.

The reason for this marked increase in Venezuelan production is due to the fact that the money invested by British and American interests there is bearing fruit. At first it was extremely difficult to get the oil out of Venezuela even after it was found. Now, however, with new pipe lines, improved transportation facilities, new

refineries and increased storage facilities, everything seems to indicate that Venezuela will play an important part in the oil game of the future.

This will be particularly true if the American supply dwindles in the near future.

American interests have recently become very active in Venezuela and are well intrenched in the old fields. Royal Dutch Shell interests produced most of the oil in 1924, but since then Standard Oil interests have become important competitors.

An interesting point to note in connection with British and American interests in Venezuela is the fact that a subsidiary of the Standard Oil is working two important concessions of a British controlled company, under contract.

Venezuela bids fair to become a very important oil-producing country in the near future and may possibly supplant Mexico in second place.

Colombia

Colombia produced very little oil in 1924, only 445,000 barrels, and all of this by a subsidiary of the Standard Oil. What has been said of Venezuela is equally true of Colombia, namely, that foreign capital invested has borne fruit.

The Tropical Oil Co., subsidiary of the Standard Oil, will open up a new pipe line from its Colombian oil fields to the shipping port near Cartagena on May 1 of this year.

Storage has been provided both near the fields and at the shipping port to take care of the oil.

The Standard Oil seems to have the inside track on Colombian oil.

Mosul (*Iraq*)

While summarizing production in the principal oil-producing countries of the world, present and future, it is necessary to mention one of the greatest gambles in the oil industry.

In 1925 an international oil group, known as the Turkish Petroleum Co., was given exclusive rights for prospecting for oil in certain defined areas in Iraq, by the Government of Iraq. The prospecting rights of this company include the Mosul area, which has been stated by many geologists to be one of the richest oil pools in the world.

Iraq has been a bone of contention between Turkey and Great Britain ever since the war, and several times these two nations have been on the point of actual conflict over the possession of the northern part of the country, known as the Mosul district.

The matter was definitely settled (at least for the present) when the League of Nations Council, which had been requested to adjudi-

cate the question, finally awarded the mandate of Iraq (including the Mosul district) to Great Britain.

Although the Turkish Petroleum Co. received the concession for prospecting for oil in 1925, it was not until the mandate had been definitely awarded to Great Britain in January, of this year, that any active steps were taken by the company to do any prospecting.

Interest in the Turkish Petroleum Co. was allotted as follows: Royal Dutch Shell group, 25 per cent; Anglo-Persian Co., 25 per cent; French interests, 25 per cent; American interests (including Standard Oil), 25 per cent.

It is not known definitely at this time (May, 1926), whether or not the 25 per cent American interests are to be actually taken up or not, but it is known that American geologists are working with the other geologists of the Turkish Petroleum Co. in the district.

At present no oil is produced in the Mosul area, but there must be sufficient evidence of it to warrant such astute organizations as the Royal Dutch Shell and Anglo-Persian Oil Co. to take definite steps to prospect and develop oil concessions in such a far-off, uncivilized land which is full of so many obstacles.

If oil is discovered in paying quantities, it will take years to get it out, and take many millions of dollars of investment. It will be necessary to construct a pipe line through mountains and deserts inhabited by uncivilized tribes, from the oil-bearing areas hundreds of miles to a shipping port, either on the Mediterranean or Persian Gulf. It is an interesting development to watch and it may or may not play a very important part in the oil game of the future.

Other oil producing countries

The above countries described are those which have the greatest production at present and potentially for the future and all the other oil producing countries, at least so far as it is known at present, are not expected to take any great part in the production of oil in the future.

Other countries where British or American interests predominate at present are as follows: India, all British; Peru, mainly American; Trinidad, all British; Egypt, all British; and British Borneo, Royal Dutch Shell.

Summary of production

Summarizing production throughout the world, it will be seen that American and British interests control 93 per cent of the present world oil production, and of the total amount controlled by both nations, the United States interests control fully 83 per cent.

At present the United States interests predominate in the control of production in the United States, Mexico, Colombia, and Peru,

and British controlled interests predominate in Persia, India, Dutch East Indies, and Trinidad.

Honors are about even in Venezuela and neither control any production in Russia.

So long as continental United States continues its lead in world production it will continue to predominate in its control of production, but if it ever slides back, the control will pass into British hands.

II. Transportation

In discussing transportation of oil from the producing areas to the points where it is to be refined, sold, or stored, it will be apparent to anyone that the United States with production at its back door has the easiest problem. The United States is covered with a network of pipe lines and oil-carrying railroads from the oil pools to the refining, storage, and selling points.

Therefore, just so long as the United States predominates in oil production in the world, so long will this feature of the oil industry be solved by the United States. However, let us look at it from another standpoint.

In the chapter discussed above under "Production," it was mentioned that the consumption of petroleum in the United States was gradually approaching the point where it will be equal to or pass production in this country. The ability of this country to keep up with consumption will then largely depend upon the ability to transport oil from foreign countries to fill the deficiency.

It will be interesting to note in connection with this phase of the industry that on June 1, 1925, there were 377 ocean-going tankers of 1,000 gross tons and above under the American flag, with a total oil-carrying capacity of 25,032,700 barrels, and on the same date there were 372 tankers of the same tonnage under the British flag, with a total approximate carrying capacity of 24,738,000 barrels.

The above figures include 20 American and 62 British Navy tankers. Another interesting feature of the above figures is that of the tankers under the British flag there were 23 tankers belonging to the Anglo-American Oil Co. (Ltd.), a British concern which transports and markets practically nothing but Standard Oil products.

Of the tank fleets of the world, naturally the largest number belong to the three great oil groups mentioned above under "Production"—the Standard Oil, the Royal Dutch Shell, and the Anglo-Persian.

On January 1, 1925, there were 197 tankers employed in Standard Oil service, of which 47 (including those of the Anglo-American Oil Co.) were under the British or Canadian flags. On the same date there were 147 tankers transporting Royal Dutch Shell products, of which 117 were under the British flag and 30 under the Dutch.

The Anglo-Persian Co. on the same date had 75 tankers (not including British naval tankers), all of which were under the British flag.

To show what transportation means to the oil industry, although there was produced within the confines of the British Empire in 1924 only 16,500,000 barrels of petroleum, approximately 94,000,000 barrels of liquid petroleum products found its way into the Empire. This does not include the bunker fuel oil for vessels, which is not classed as an export, but it does include exports of oil-producing areas within the Empire to various other parts.

Of the total 94,000,000 barrels, the United States exported nearly half, 43,000,000 barrels. Persia and Mexico come next in the order named with approximately 18,000,000 and 11,000,000, respectively.

III. Marketing and Storing

The marketing of oil means the distribution and selling of petroleum products by commercial concerns.

One may go one step further under the caption "Marketing" and include the storage of oil by the two navies and commercial companies.

The reason for this is an endeavor to show how much the storage of oil in various parts of the world plays in commerce and naval policies.

Petroleum products are marketed and stored by commercial companies and stored for naval use by navies.

As has been shown above under "Production" and "Transportation," the three great oil groups again control most of the marketing of petroleum products of the world. They either do it directly or through subsidiary or affiliated companies throughout the world. In the United States, owing to the enormous numbers of gasoline propelled vehicles, the greatest marketing effort is toward the marketing of gasoline. In the British Empire, the greatest effort is directed toward the marketing and storing for future use of fuel oil for the navy and merchant marine.

As fuel oil is the product of peroleum which is the most vital to both the merchant marine and the navy, only that product of petroleum will be discussed in these pages.

The creating of fuel oil storage stations throughout the world has been much more energetically prosecuted by the British Navy and commercial concerns than by either the American Navy or American oil interests.

Dividing the storage of fuel oil into two parts, naval and commercial, will make the subject much clearer for discussion.

(a) *Naval fuel-oil storage*

The cohesion of the British Empire depends upon keeping open her lines of trade route throughout the world and this must be done in peace as well as war. One of the primary duties of the British Navy is to maintain the security of these trade routes. In order to enable the British Navy to accomplish this, fuel-oil stations have been established all over the world.

In addition to immense storage stations in the United Kingdom, the British Navy has fuel-oil storage stations at Gibraltar; Malta; Aden; Colombo and Trincomalee, in Ceylon; Port Said and Suez, in Egypt; Port Sudan, on the Red Sea; Singapore; Rangoon, Burma; Hongkong; Sydney, Australia; Auckland, New Zealand; Simonstown (near Cape Town), South Africa; Sierra Leone, British West Africa; Falkland Islands; Bermuda; Kingston, Jamaica; and Esquimalt (near Victoria), British Columbia. Also, all the bunkering stations of the Anglo-Persian Oil Co. may be considered as auxiliaries to British naval fuel-oil stations.

British naval fuel-oil stations vary greatly in the amount of storage, according to the idea of the importance of the station. The greatest, outside of the United Kingdom, is Singapore with 4,550,000 barrels. The next largest is Rangoon, Burma; then Trincomalee, Ceylon (under construction); then Gibraltar; Malta; Colombo, Ceylon; Hongkong; and Aden, in the order named.

To compare with these stations the United States Navy (outside of the continental limits of the United States) has fuel-oil storage stations at Pearl Harbor, Hawaii; Guantanamo, Cuba; Cavite, Philippines; and the Canal Zone.

The storage at Pearl Harbor compares favorably with Singapore; Guantanamo has less than Colombo, Ceylon; Canal Zone compares with Aden and Cavite with Bermuda.

There seems to be very little more to be said on this except to restate that the British Navy has 62 tankers and the American Navy has 20 tankers.

(b) *Commercial fuel-oil storage*

To fuel the British merchant marine and to augment the British naval fuel-oil storage throughout the world, British controlled oil-marketing concerns have fuel-oil storage stations all over the world.

Not taking the United States or the United Kingdom into consideration, Royal Dutch Shell marketing concerns have fuel-oil bunkering stations in 118 foreign ports, the Anglo-Persian-Burmah 30, and British Independent 3. Total, 151.

Not considering the United States or United Kingdom, the Standard Oil marketing concerns have fuel-oil bunkering stations in 89 foreign ports, and American Independent companies 30. Total, 119.

Most of the American controlled bunkering stations are in North, Central, and South America, and the West Indies, and it can be said truthfully that they predominate over British controlled stations in those regions.

In all the rest of the world, except perhaps in northern Europe, British controlled bunkering stations predominate.

The Royal Dutch Shell has the greatest number of any group of oil interests in the world.

IV. Consumption

There is very little information on the consumption of petroleum products except for the United States and the United Kingdom.

The domestic United States consumption of petroleum products is rapidly approaching the domestic production. In 1924 the domestic production was 713,940,000 barrels and domestic consumption was 621,519,000 barrels. There is said to be a sufficient supply in reserve to last this country about six months if all production was stopped immediately.

The dominating factor in American consumption is gasoline, owing to the enormous number of motor vehicles. In the entire British Empire at the end of 1924 there were only about one-seventh as many motor vehicles as there were in the United States. The consumption of gasoline in the British Empire by motor vehicles would be much less than one-seventh that of the United States because of the better efficiency of foreign automobile engines.

The dominating factor in the consumption of petroleum products in the British Empire is oil fuel for ships—fuel oil and Diesel oil. There are no figures to show the amount of this consumption in the British Empire, hence no comparison can be made.

Policies

In the United States there appears to have been no very definite policy in regard to petroleum, because there never has been any particular need for one other than to get it out of the ground as quickly as possible and sell it as soon as possible.

Owing to the alarming reports of some geologists, however, the big oil concerns are apparently making efforts to store as much oil as they can for a reserve, and new storage tanks are building all over the country.

The Standard Oil Group is apparently making a definite effort to secure new oil concessions in foreign oil fields and to improve and expand those already secured.

The British have been proceeding on a very definite oil policy, both private and governmental, for many years.

British-controlled private concerns have secured oil concessions in almost every oil-bearing country in the world, including large holdings in continental United States. Through its interest in the Anglo-Persian Oil Co., the Government is able to take an active part in all phases of the industry.

By establishing naval and commercial oil-storage stations all over the world, a very definite policy has been adopted to assist and maintain both the navy and the merchant marine.

The British have attempted on a larger scale than anyone else to obtain oil from shale, and two or three commercial concerns, bolstered by the Government, have been engaged in this industry for quite some years.

It has been found impossible, however, to compete with the natural petroleum industry, and discussion is now going on in England whether to cease operations altogether or not.

The British Admiralty has always given the shale-oil concerns a contract for a certain amount of oil, but this year, owing to the naval economy program, it was not renewed, owing to the higher price of shale oil.

This left the shale-oil industry without its principal means of support.

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O. N. I. BULLETIN—JULY, 1926

FOR CONVENIENCE IN ROUTING

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SIXTH DIVISION OFFICER			
MARINE OFFICER			

The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

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O. N. I. MONTHLY INFORMATION BULLETIN

VOL. IX JULY, 1926 No. 1

ARGENTINA

MISCELLANEOUS NOTES

Fleet Organization for 1926

Division of instruction.—Battleship *Rivadavia*, armored cruiser *Belgrano*, armored cruiser *Garibaldi*, dispatch boat *Azopardo.*

Division of exploration.—Cruiser *Buenos Aires*, torpedo boat destroyer *Jujuy*, torpedo boat destroyer *La Plata.*

Group of mine sweepers.—Dispatch boats *A–2*, *A–4*, *A–7*, and *A–10.*

School boats.—Armored cruiser *Garibaldi*, machinery and seamanship; *Almirante Brown*, artillery; *Presidente Sarmiento*, recruits; *A–3*, training for aviation school.

Hydrographic boats.—Transport *First of May.* Lighthouse tender, *Mackinlay;* gunboat *Patria.*

Appropriation for navy vessels

According to the press the President of the Argentine Republic has issued a decree authorizing the Minister of Marine to expend 32,000,000 pesos, approximately $12,000,000 U. S., for the purchase of new naval vessels.

The vessels under consideration are two cruisers, three submarines, two destroyers, and two gunboats, the total comprising a displacement of 15,000 tons. The money will be available in three quotas, 1927, 1928, and 1929.

Information previously received would indicate that each cruiser will have a displacement of 5,000 tons. The submarines will be small and will be used primarily for the instruction of personnel. Incidentally, these will be the first submarines to be incorporated in the Argentine Navy.

The press further states that the President of the Republic has resolved to send Rear Admiral Ismael F. Gallindez to London charged with the direction of the work in question.

As reported previously, an appropriation for the purchase of naval vessels was passed by the Senate and not by the Chamber of Deputies. No change has been made since that time and it is believed that the president considers that the new Congress now in session will appropriate the money in question.

Very little, if any, definite information can be obtained from the Argentine naval authorities as it has developed that the money presumably available and mentioned in above reference was absorbed during the past administration by other departments of the Government. The money mentioned in the newspapers and by the authorities as available for purchase of new naval vessels was that remaining after appropriation made in 1909, which included 12 destroyers. But four of these were completed and it was the money remaining for the construction of eight destroyers that it was intended to use.

Regarding types of vessels no definite information is available, and it is seriously doubted if any group of officers or any commission of officers knows exactly what it wants. Among the ideas regarding types that have been mentioned is that of the Japanese light cruiser *Kuma*. This type is of 5,500-ton normal displacement, and if two cruisers of this displacement were desired it would seem rather difficult to construct two destroyers, three submarines, and two gunboats from the remaining 4,000 tons of the 15,000 tons desired.

Several of the younger officers who are very frank in their statements mentioned to me that what they did want in place of the two cruisers of that displacement were two smaller cruisers larger than destroyer leaders and somewhat similar to the *Constance* class. However, but one of these officers has any influence with higher authorities, but in his case no doubt very careful attention will be paid to his recommendations.

The moving spirit in this project seems to be Commander Juan M. Pastor, who has been secretary to the Minister of the Marine. Under date of the 27th of May, 1926, an order has been issued designating him as a member of the naval commission in Europe. It is understood that he will visit Italy for a period of about one month prior to taking up his duties in London. A naval officer, mentioned as one of the brightest men in the Argentine Navy, stated that under any circumstances he did not think that they would be able even to make contracts for these vessels within two or three years.

The newspapers at first published bare facts regarding the action of the President in issuing the above decree. Recently one of the influential papers has published two strong editorials on this subject.

One of them questions the legal right of the President in issuing this decree owing to the fact that it is in conflict with a law passed regarding the use of money remaining after an appropriation for a specific contract. This newspaper heretofore has been one of the strong supporters of the President, but within the past six months has been more or less against him and antagonistic, and ends one of its editorials by saying that the Government of this country is becoming every day worse and worse.

There follows a translation of the editorial published in La Prensa under date of May 22, 1926, entitled "Irregular financing of the acquisitions for the fleet."

Public opinion has been surprised by a proposal to acquire naval vessels at a cost of 32,000,000 pesos, for which no authorization exists. The executive power believes itself authorized to carry out this plan by reason of an armament project sanctioned in 1908 which, on account of the war, was never concluded. But the executive power fails to recognize that, even if said law be considered as existing, it would be contrary to financial principles and to written law should he compromise by decree the rents or the credit of the nation without new legal authorization * * *.

Plans for flight from Rome to Buenos Aires and New York

[From the Argentine press]

The Cosulich Line, in conjunction with the Italian Government, is planning a spectacular flight to demonstrate the reliability of the type of seaplane used by the company as an adjunct to its steamship service. The proposed flight will be from Rome, via Cape Verde to Pernambuco, thence to Rio de Janeiro, Porto Alegre, and Buenos Aires; thence across the Andes to Valparaiso, up to Guayaquil and Panama, Havana, New York, and Newfoundland, whence the plane will fly homeward via Azores, Portugal, and Spain to Rome and Trieste, a total distance of about 30,000 miles. The plane selected for the flight is a trimotor seaplane of the type made by the company in its own shipyards at Monfalcone, where the Giant motorships *Saturnia* and *Oceania* are now under construction. The motors are of the Isotta-Fraschini type and are guaranteed for a speed of 125 miles an hour. Marquis Centurione, the noted Italian aviator, is to be the pilot. The route to Brazil will be approximately that of the company's steamer track between Italy and South America. The plane is to be christened *Cosulich No. 1.* It is expected that the flight will require about 230 hours of actual flying time and that the tour will be completed in about two months. The Cosulich Line is now using airplanes on the Trieste-Constantinople routes, and extensions of the service are contemplated to enable passengers to make quick landings from ship to shore.

New air station established by Army

On May 8, 1926, five Bristol airplanes, each of 300 horsepower, left the aerodome at Palomar (Army) for the new military base at Paraná, where they will be stationed in the future.

The new aerodome is situated about 5 miles from the capital of Entre Rios. The Province of Entre Rios is across the Uruguay River from the western border of Uruguay.

Total population of Argentina

According to the calculation made by the statistical department, the population of the Argentine Republic reaches 10,087,118.

Organization and strength of Army

[Source, M. I. D.]

Armed or semiarmed forces considered immediately available for mobilization under Federal authority in event of war.

Component	Total actual	Total authorized	Mobilization or war strength deduced	
			Trained	Untrained
(*a*) Army of the line permanent army	32,908	32,908	32,908	
Reserve	(Unorganized).		175,000	[1] 350,000
(*b*) National Guard	(Unorganized).		[1] 100,000	[1] 200,000
(*c*) Territorial guard	(Unorganized).		[1] 20,000	40,000
(*d*) Police	20,000	20,000	20,000	

[1] Estimates.

The only component of the Argentina Army which is actually armed is the permanent army, the other components are unarmed and unorganized and the strength is estimated, except the provincial, territorial, and municipal police of Buenos Aires.

There has been little attempt on the part of the Argentine Government to keep up the training of the reserve and the national or territorial guard, and consequently the training of the men in these organizations who have served their term in the permanent army deteriorates rapidly as time goes on.

In time of mobilization it is probable that the organizations formed from the reserve and national or territorial guard would have to undergo considerable training before they would be available for field service.

The police from the city of Buenos Aires, the provinces and territories would probably be of but little value in time of war as combat organizations.

About one-third of the available man power who reach 20 years of age are taken into the army each year; the remainder receive no military training during their career.

CENTRAL AND SOUTH AMERICA

FOREIGN MILITARY MISSIONS IN AMERICA

[From the Mexican press]

Almost all the American republics have at present European military commissions which have been intrusted with the reorganization of the armed forces of the various nations. It is self-evident that these military missions do not only modernize their armies by putting them on a truly efficient basis, but they also succeed in inculcating in the officer's mind certain ideas that are utterly conflicting with American idiosyncrasy. When, for example, these missions have been rather large in number and have stayed in a country for a considerable length of time, the armed forces of that nation have acquired the typical characteristics of the European nation from which the military mission comes. The Army of Chile, which has been modernized by German experts, is a good example.

The characteristics of the European armies are found to-day, to a more or less extent, in the American armies, because there are few nations in America where there is not a foreign military mission.

We will briefly mention the various military missions, going more into detail concerning the military missions of Chile, Peru, and Brazil because, due to their initiative, they are superior to all others.

The Republic of El Salvador has, at present, a Spanish military mission in charge of the national guard schools and of the schools of other services, and there is a strong agitation with a view to bringing a German military mission to that country.

Colombia has recently signed a contract with a Swiss military mission.

Ecuador has an Italian military mission; Bolivia's chief of staff is the German major general von Hans Kundt, under whose wise guidance the army is rapidly improving.

Peru [1] and Brazil both have French military missions. The German military mission in Chile has introduced radical modifications in the reorganization of the Chilean Army.

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[1] The last French mission in Peru apparently did not met with success and was withdrawn about a year and a half ago.—Ed.

French officers are employed as professors in the "escuela militar le applicacion" of Mexico (military school of application).

As may thus be seen, the tendencies of the European armies are becoming deeply rooted in all the American military institutions.

Let us take Chile, Peru, and Brazil more in detail:

In 1885 at the suggestion of Santa Maria, who was then President of Chile, a contract was offered to Emilie Korner, a brilliant Prussian artillery officer.

The selection of this officer was very favorably received in Chile, and almost extraordinary powers were granted him. He commenced his reorganization work without delay.

In 1887, the "academia de guerra" (academy of war) for the training of general staff officers, was established at Captain Korner's suggestion. In 1891, after having been promoted to the rank of general, this officer was made chief of staff of the Chilean Army, in which position he continued his reorganization work. Later on, in 1895, he obtained authority from President Montt to bring 30 German officers to Chile to assist him in his work. These officers were, upon their arrival at Chile, assigned as instructors in the schools as well as with the troops, and military regulations were immediately drawn up.

A short time afterwards, Chile adopted the compulsory military service, and she soon became one of the leading military nations in America.

General Korner was retired in 1910, after 25 years of most faithful service in the Chilean Army.

Peru:[1] Peru has, at present, a strong French military mission. General Clement is the oldest member of this mission in point of service. He came to Peru under contract in 1898, and is responsible for the establishment of the military school of Chevrilles in that year.

General Clement is 71 years of age, at present, and has served for 28 years in the Peruvian Army. He is now chief of staff, and as such has carried out the work of reorganization which is responsible for the present satisfactory state of progress of the Peruvian Army.

In 1922, a new mission,[1] headed by General Pellegrini, was incorporated to that of General Clement. It was composed of brilliant officers, all of them of World War experience and among whom, besides General Pellegrini, we recollect Colonels Chevalier, Bourgrugrion, Prion, and Lieutenant Colonel Verdy. Colonels Gobaux, Doucep, and Major Hurdelat already were in Peru with General Clement.

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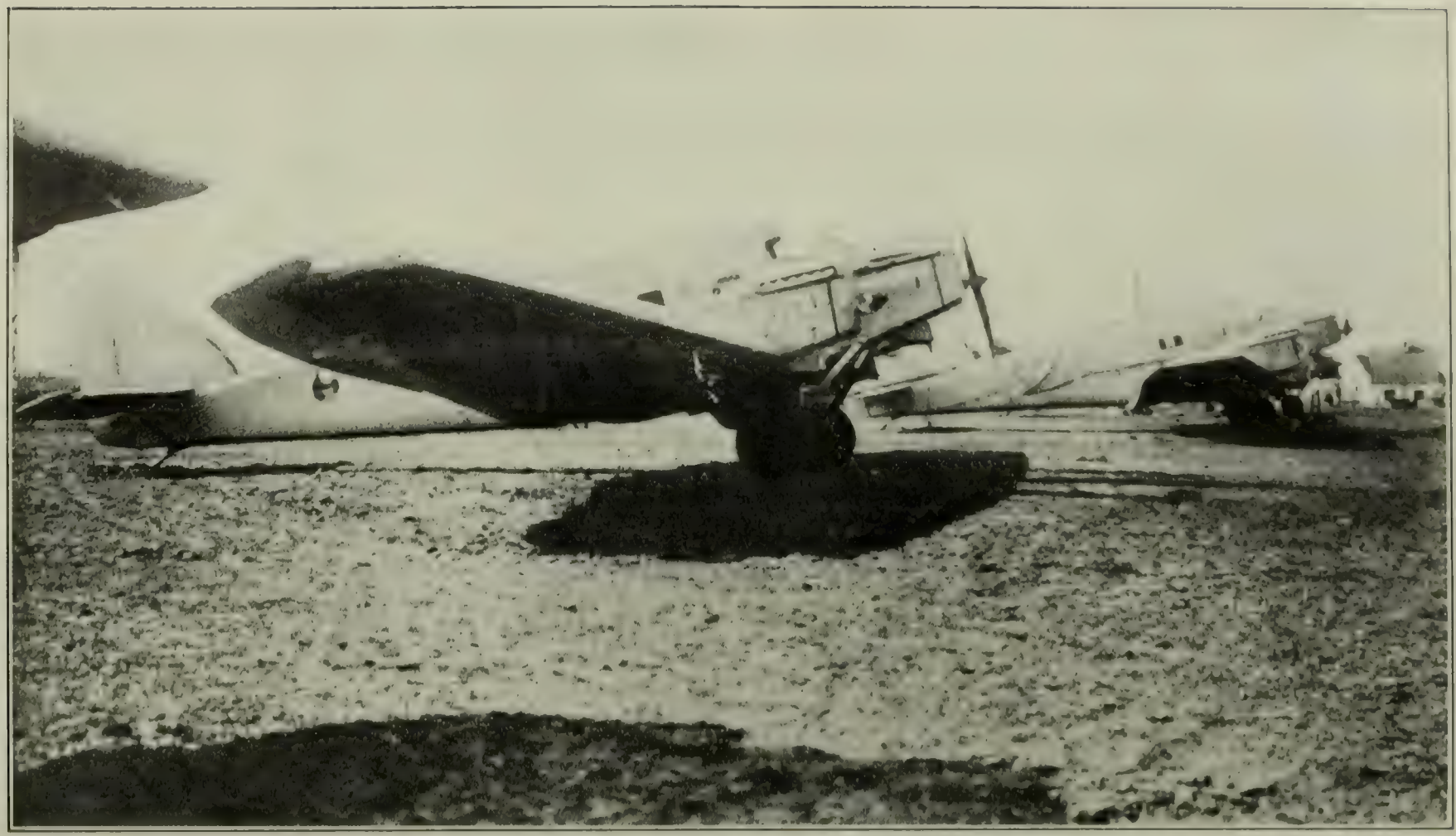
[1] See note p. 5.



TYPE R-42 JUNKERS BOMBING PLANES FOR CHILEAN ARMY

Similar to the Chilean mission, this mission has received strong official support, and its members have been given the positions of greatest responsibilities, such as that of director of the center of military studies, military school, intendance, geographical service, inspector general, veterinary service, etc.

Brazil: As has already been said, Brazil has at present a French military mission, charged with the reorganization of the army. This mission is headed by Major General Gamelin, who is technical adviser of the general staff. There is also a brigadier general, who is the technical director of the "escuela superior de guerra," and 8 colonels and 22 officers of lesser rank who have undertaken the task of carrying out an extensive improvement in military affairs.

These are, in general, the various foreign military missions, which no doubt have completely modified the military organs of this continent.

CHILE

NEW AIRPLANES

Photograph shows two of Chile's new bombing planes constructed in the aerial base at Linham, Switzerland, for the Chilean Army. These planes are of type *R–42* Junkers, have three L. V. motors of 300 horsepower, weigh (empty) 3,850 kilograms, and with maximum cargo 6,500. Speeds, with maximum cargo, 165 kilometers an hour; half, 155; and minimum, 110. Ascensional velocity, with maximum cargo, at 1,000 meters, 7 minutes; at 2,000 meters, 17 minutes; at 3,000, 31 minutes. Theoretical ceiling, 4,300 meters. Radius of action, 7 hours.

ESTHONIA

NAVAL NOTES

[Source, M. I. D.]

Speed of torpedo craft

The principal units of the Esthonian Navy, the *Lennuk* and the *Wambola*, can maintain 32 knots in formation. Under forced draft it is alleged they can make 36 knots, steaming singly. These ships are of the same type as the Russian *Karl Marx* class, which are reported as in good condition, and can presumably do the same.

The maximum speed of the torpedo boat *Sulew* is 26 knots.

Personnel strength

The Esthonian Navy has at present 33 officers, of whom 6 are ex-Russian naval officers, for naval duty, and in addition 70 officers assigned to duty with the artillery coast defenses; total, 103 officers.

At present the enlisted strength of the navy is 800, exclusive of the personnel of the artillery coast defenses of about 900; total naval and coast defense enlisted personnel, 1,700. The annual increment of recruits for the navy and coast defense is about 550. Each class serves for two years. In addition to this 1,100, there are about 600 volunteers ($550 \times 2 = 600 = 1,700$). There are practically no volunteers for the army, but the naval service and, to a less extent, the coast defense appear to be rather popular, which accounts for the relatively large proportion of volunteers therein.

FRANCE

NAVAL BASES AND STATIONS

[June 25, 1926]

The attached table, compiled by O. N. I., gives the latest available information on French naval bases and stations at home and abroad.

FRANCE

MISCELLANEOUS NOTES

Suffren keel laid

On May 3 the keel of the *Suffren*, latest type 10,000-ton light cruiser, was laid at Brest by the préfet maritime.

It is expected to have the *Suffren* ready for launching about January, 1927.

The *Suffren* is of the *Duquesne* class; dimensions, etc., are as set forth in Jane's, 1925.

Submarine Espadon launched

The submarine *Espadon* (1,150 tons) was launched at Toulon May 27.

The launching took place without any ceremony, due to strict economy prevailing in the Navy Department.

NAVY DEPARTMENT, OFFICE OF NAVAL INTELLIGENCE.

25 JUNE, 1926.

FRENCH NAVAL BASES AND STATIONS AT HOME AND ABROAD. AT HOME AND ABROAD.

NAME.	NAVAL CLASSIFICATION AND FUNCTION.	DRYDOCKS, NUMBER AND DIMENSIONS OF LARGEST. NAVAL.	DRYDOCKS, NUMBER AND DIMENSIONS OF LARGEST. COMMERCIAL.	REPAIR FACILITIES, BUILDING WAYS. NAVAL.	REPAIR FACILITIES, BUILDING WAYS. COMMERCIAL.	(BARRELS) FUEL OIL STORAGE. Naval.	(BARRELS) FUEL OIL STORAGE. COMMERCIAL.	Is IT DEFENDED.	REMARKS.
AT HOME.									
1. TOULON.	Main base for Mediterranean Fleet. Has large dockyard.	10 Drydocks. Largest (Length - 1,200 feet. Width - 100 feet. (Depth -	1 Floating drydock. Length - 600 feet. Width - 100 feet. Depth -	Repairs of all kinds to hull and machinery. Building ways for ships up to Light Cruisers	Large private dockyard for repairs. Building ways for ships up to 9,000 tons.	357,000 (Additional storage being constructed.	None.	Yes.	Most important French naval base. Main fleet bases here. Repair facilities about the same as Philadelphia yard. Large coal depot.
2. BREST.	Main base for Channel and North Sea Fleet. Has dockyard.	8 Drydocks. Largest (Length - 820 feet. Width - 118 feet. (Depth - 35½ feet.	1 Drydock. Length - 730½ feet. Width - 87 3/4 feet. Depth - 39¼ feet.	Repairs for all ships up to Light Cruisers. Building ways for Light Cruisers.	Machinery repairs by commercial concerns.	196,000	None.	Yes.	Is second largest French naval base.
3. CHERBOURG	Secondary naval base with dockyard.	9 Drydocks. Largest (Length - 820 feet. Width - 118 feet. (Depth - 46 feet.	1 Small drydock. Length - 259 feet. Width - 45 3/4 feet. Depth - 19¼ feet.	Repairs to submarines and destroyers. Building ways for submarines.	Machinery repairs.	105,000	None.	Yes.	Was once a Primary naval base, but has been greatly reduced. Mainly submarine base now.
4. LORIENT.	Auxiliary base now used for naval construction, only.	3 Drydocks. Largest (Length - 669 feet. Width - 116½ feet. (Depth - 38 3/4 feet.	None.	This yard is now building light cruisers, destroyers and submarines.		119,000	None.	No.	Owing to small harbor, could not be made an important base.
5. ROCHEFORT.	Naval dockyard. (Not used except for manufacture of Ordnance material).	3 Drydocks. Largest (Length - 492 feet. Width - 61 feet. (Depth - 25 feet.	1 Drydock (Small). Length - 318 feet. Width - 46 feet. Depth - 22 feet.	Naval dockyard managed by Municipal authorities.	Repairs can be made at Naval dockyard and at small repair yard.	None.	None.	Yes, but probably obsolete.	The only naval activity at Rochefort is an Ordnance factory. Depth of water too shallow for anything except light craft.
ABROAD									
6. BIZERTA, TUNIS.	Naval base with drydock. At present it is a submarine base. Large coal and oil stores.	3 Drydocks and one large one uncompleted. Largest (Length - 656 feet. Width - 90½ feet. (Depth - 32½ feet (See remarks)	None.	Yard has facilites for repairs to all classes of ships. At present activities greatly curtailed.	None.	224,000 (More storage under construction	230,000	Yes.	Has facilities for being important base but activities are curtailed. At present is a submarine base. New large drydocks and fuel oil tanks authorized.
7. ORAN, ALGERIA.	Undeveloped destroyer and submarine base. No dockyard. Fuel oil storage.	One small floating dock for tugs. Now out of commission.	None.	None.	Practically none.	32,000	300,000 (Approx.)	By medium caliber guns.	Would make excellent destroyer and submarine base if developed. At present only sub-chasers and aircraft base.
8. SAIGON, INDO-CHINA.	Small naval station with dockyard.	2 Drydocks and one small floating dock. Largest (Length - 530 feet. Width - 72 feet. (Depth - 30 feet.	None.	Ordinary repairs to gunboats.	Small ship repairs.	None.	None.	Obsolete.	Is a small repair base for vessels on Asiatic Station which consists of a few small, obsolete ships.
9. AJACCIO, CORSICA.	Undeveloped destroyer and submarine base without dockyard.	None.	None.	Minor repairs to small craft.	None.	26,000	None.	Yes (reported obsolete)	Was used as destroyer and submarine base during war. Now practically unused. Poor facilities as a base.
10. DAKAR, SENEGAL.	Undeveloped naval station.	1 Drydock. Length - 630 feet. Width - 82 feet. Depth - 30½ feet.	Naval drydock can be used for commercial ships.	Not known but minor if any.	Small commercial repairs.	14,000	77,000	Not known.	Is a potential base. Practically unused now. Is a French aviation base.
11. DIEGO SUAREZ, MADAGASCAR.	Undeveloped advanced base and coaling station.	1 Drydock for naval or commercial use. Length - 636½ feet. Width - 82 feet. Depth - 37½ feet.		None.	Two small ship repair concerns.	None.	None.	Yes but probably obsolete.	Is a reserve coaling station for French Navy. Could be developed into an advanced base. Oil storage proposed.
12. BEIRUT, SYRIA.	Small naval harbor. No dockyard. Base for French navy in Syrian waters.	None.	None.	None.	Small machinery repairs.	None. (coal only)	None.	None.	Serves as a small protected naval anchorage for naval ships in Eastern Mediterranean. No naval base facilities.
13. CASA BLANCA, MOROCCO.	Protected naval anchorage. Being used as advance base for operations in Morocco.	None.	None.	None.	Small shipyard for minor repairs.	None.	None.	Not known.	Is merely a commercial port now acting as temporary advanced base for Army, Navy and Aviation operations in Morocco.
14. ALGIERS, ALGERIA.	Small naval anchorage.	None.	2 Drydocks. Largest (Length - 368 feet. Width - 54½ feet. (Depth - 24 feet.	None.	2 Commercial repair plants with facilities for repairing gunboats.	None.	50,000	By light calibre guns.	Is of very little value as a base. Small craft based here during war. Naval air station located here.

Construction of special training ship for French cadets

Instead of converting an old cruiser into a training ship to replace the *Jeanne d'Arc* the French have decided to build a new school ship for cadets. This ship to be used as an "auxiliary cruiser" in time of war.

In drawing up the plans of the school ship, its special use as a school ship will be the first consideration.

As a measure of economy her machinery will be devised so as to consume the least amount of fuel.

To assure the best conditions possible for practical instruction, her battery and torpedo installation will be such as will be met with in actual service; all interior conditions will be similar, in so far as is possible, to those on board ships in actual service; living quarters and general comforts of cadets will be given special study.

Thus, the annual running expenses of the new school ship, count ing 75 cadets, will be 6,594,000 francs, while the *Jeanne d'Arc*, counting 75 cadets, cost 10,916,000 francs, for the year 1925.

In addition, the new school ship will have quarters for 125 cadets against a maximum of 80 for the *Jeanne d'Arc.*

A comparison of the expenses, for each cadet, on the *Jeanne 'Arc* and the new school ship is as follows:

"Jeanne d'Arc," year 1925

Running expenses	francs	10,916,000
Cadets embarked		75
Expenses per cadet	francs	145,500

New school ship

Running expenses (1925 figures	francs	6,594,000
Cadets embarked		75
Expenses per cadet	francs	87,900
Probable expenses for 125 cadets	do	7,400,000
Or, expenses per cadet	do	59,200

French losses in Morocco

In denial of press rumors exaggerating French losses in Morocco, the Minister of War issued the following information in the form of a communique:

French soldiers, including Foreign Legion, killed in Morocco from April 15, 1925, to May 25, 1926:

Killed	1,306
Missing	294
Died of disease	562
Total	2,162

NOTE.—Since many members of the Foreign Legion are not of French nationality, the actual number of French dead in Morocco is less than 1,300.

FRANCE

NAVAL AIR SERVICE

As of December 31, 1925

[Source, M. I. D.]

The French naval air service is a part of the French Navy, all of which is considerably below average from the standpoint of efficiency and morale. The naval air service declined steadily after the war, but within the past two years a decided effort has been made to raise the standard of efficiency.

New equipment is being purchased and the old obsolete aircraft are being replaced as rapidly as possible. The low state of efficiency and morale in the navy is thought to be due primarily to the method of obtaining personnel.

Conscripts are of two classes:

(*a*) Those from the Maritime Provinces who are conscripted for 3 years and who are thus required to serve twice the period of an army conscript;

(*b*) 10,000 army conscripts who are required to serve in the navy whether they desire it or not. Their period of conscription is 1½ years.

In addition, there is a voluntary enlistment of 5 years for those enlisting when under 18 years of age, and 3 years for those over 18 years of age.

The "army conscripts" come from the manufacturing centers and constitute the greater part of the air service contingent since they are conscripted from the mechanical classes. Their period of conscription is too short to permit of their being properly trained and their morale is often low, due to the fact that they do not desire to serve in the navy.

Ten squadrons have been organized in naval aviation, as follows:

One squadron of fighting planes.

Five squadrons of scouting and observation planes.

Four squadrons of bombing and torpedo planes.

The present plans call for expansion of the naval air service to 50 squadrons of which 20 will be fully manned, 19 with reduced crews and 11 with reserve crews. It is planned to expand the number of personnel to 10,000.

Of the ten squadrons mentioned above, 8 are serving at home and 2 abroad (Bizerta).

A reconnaissance and a bombing squadron each consist of 3 sections, each comprising 3 active planes and 1 replacement plane.

Thus each squadron consists of 9 equipped planes in time of peace and 12 equipped planes when on a war footing.

A pursuit squadron consists of 3 sections, each section consisting of 3 active and 2 replacement planes. Thus each squadron consists of 9 equipped planes in time of peace and 15 equipped planes when on a war footing.

At the present time the naval air service is considered generally as an adjunct of the coast defense. It is beginning to create a seagoing air force which will be an adjunct of the fleet.

The coast of France is divided into 4 maritime frontiers and the air forces are administered as part of these maritime frontier districts.

The air forces of the northern maritime frontier are based at the following stations: Dunkirk, Cherbourg, and Montebourg.

The Atlantic maritime frontier includes the stations of Brest, Lorient, Rochefort, and Hourtin.

The air forces of the southern maritime frontier are based at the following stations: Cuers-Pierrefeu, Palivestre, Berre, and St. Raphael.

The air forces of the north African frontier are based at: Sidi Ahmed, Karouba (Bizerta), and Baraki.

Personnel

Total number of officers (pilots included)	210
NOTE.—Of this number 152 line officers, 51 different corps, 7 warrant officers.	
Total number of officer pilots	60
Total number of enlisted men (includes pilots)	3,600
Total number of enlisted pilots	160
The maximum strength allowed for enlisted strength personnel is	3,650

Reserve personnel

Total number of officers, approximately	125
Total number of warrant officers, petty officers, and enlisted men	1,350

NOTE.—The above data on reserve personnel is estimated, as it is impossible to obtain from the Ministry of Marine any figures on the reserve of the navy.

Pay, allowances, flying pay, retirement pay, etc., are assimilated to those granted army air service personnel.

Equipment. Navy planes, active, reserve, and school number 260. Of these, 69 are reported as active and 120 as school planes, which leaves a balance of 71 reserve planes.

The total active, reserve, and school consists of—

Seaplanes:	
F. B. A. 150 horsepower Hispano (school) with hull	36
F. B. A. 180 horsepower Hispano (amphibian)	2
Hanriot 130 horsepower Clerget (school) with float	40

Seaplanes—Continued.

C. A. M. S. 30, 150 horsepower Hispano	7
Farman G. L. 300 horsepower Renault with hull	36
Latham bimotor 800 horsepower Lorraine Dietrich (bimotor)	12
Blanchard bimotor 600 horsepower Hispano Suiza	18
C. A. M. S. bimotor 600 horsepower Hispano Suiza	12
Farman F 60 bimotor 520 horsepower Salmson	7
Loire & Olivier bimotor 300 horsepower Hispano	29
	199

Land planes:

Hanriot 80 horsepower Rhone (school)	4
Hanriot 130 horsepower Clerget	2
Spad 34 bis 180 horsepower Hispano Suiza	7
Spad 42 180 horsepower Hispano Suiza	11
Breguet 300 horsepower Renault	35
Farman bimotor 450 horsepower Lorraine Dietrich	2
	61
Total	260

The following aircraft are on order for the naval air service:

UNDERGOING TEST

Number	Name	Type	Remarks
1	Latham	R-3	Seaplane, coastal, 3-pl.
1	Liore & Olivier	Leo H-15	Commercial seaplane.
1	Besson 26	R-2-b	Ship seaplane.
1	Levy (Biche)	C-1	Single seater pursuit airplane.

UNDER CONSTRUCTION

1	Besson	Commercial	Seaplane, monoplane.
1	C. A. M. S. 33C	do	Commercial seaplane.
	Meteore	do	Do.
1	Latecoere 15-H	do	Seaplane monoplane with float.
1	C. A. M. S. 50	R-3	Seaplane, coastal, 3 place amphibian.
1	Clement-Danhaut	R-3	Do.
1	Schneider	B-3	Torpedo seaplane.
1	Do	B-3	Torpedo airplane.
1	Villiers	R-2-b	Ship seaplane with float.
1	Schreck 24 H M B 2	R-2-b	Ship seaplane amphibian.
1	Hanriot		Service type.
2	Latham	Et-2	Ship seaplane, for catapult.

[1] Estimates.

Distribution

Cherbourg, two squadrons of reconnaissance planes (type *C. A. M. S.* and *Latham*).

Brest, two sections of seaplanes (school planes—training cadets).

Le Palyvestre, one squadron of pursuit airplanes (*Dewoitine* type); one squadron of reconnaissance planes (*Liore* and *Olivier Leo 7*).

Cuers, one squadron of bombing planes (*Farman F. 60*).

St. Raphael, one squadron of reconnaissance planes (*Blanchard*).

Bizerte, one squadron of reconnaissance planes (*Georges Levy* type); one squadron of bombing planes (*Farman F. 60*).

Schools—following bases for training of pilots, each have a few seaplanes of *Hurton*, *Rochefort*, *Berre*.

Dirigibles

Name	Capacity	Base
Mediterranee (ex German Nordstern)	22,550 cubic meters	Cuers-Pierrefeu.
A. T. 19	11,000 cubic meters	Do.
Scout (nonrigid)		Do.
Scout (nonrigid)	9,000 cubic meters	Rochefort.
Vedette (nonrigid)	3,500 cubic meters	Do.
Vedette (nonrigid)	3,000 cubic meters	Saint Cyr.

Aircraft carriers

The only aircraft carrier in the French Navy is the *Bearn*. The *Bearn* was a former battleship, the *Normandie*, launched in 1920, but not completed. She is now being converted into a carrier and will be ready for service in December, 1926.

The following details are given concerning the *Bearn:*

Displacement: 21,500 tons.
Engines: 35,000 R.P. (12 boilers).
Speed: 21.6 knots.
Radius of action: 7,500 miles at 10 knots.
Fuel: 2,100 tons of oil.
Guns: Eight 155-millimeter guns; six 100-millimeter antiaircraft.
Torpedoes: Twelve 550 millimeters.
Searchlights: Two 120 millimeters.
Complement: 755 men.

The length of the upper deck will be 160 meters (523 feet) long; the after part for the length of 16 meters (52½ feet) will be slightly inclined in order to assist landing and stopping the way of the machine, the vessel being turned head to wind and the machine landing from astern. The breadth of the deck will be 26 meters (85 feet) amidships, and will exceed 22 meters (340 cubic feet); the fore part will be tapered for a distance of 180 feet, but this should not inconvenience a skillful pilot.

Three lifts will be provided:

(*a*) One forward for the torpedo planes and bombers, length 15 meters (49¼ feet), breadth 17 meters (51½ feet).

(*b*) One for observation planes, 10 meters (32 feet 10 inches) by 15 meters (49¼ feet).

(c) One for fighting planes, 7 meters (23 feet) by 13 meters (42¾ feet).

It is expected to maintain 24 machines in the *Bearn* ready, or quickly available, for flight, divided as follows:

(*a*) Either 15 pursuit airplanes and 9 torpedo bombing machines, (b) or 15 pursuit airplanes, 4 attacking planes, and 5 reconnaissance planes.

This number could be augmented if machines with folding wings readily put in place could be obtained.

Provision is made for the pursuit planes to be absolutely ready to leave, but of the attacking and reconnaissance machines only one-third are kept ready which should fly off in 10 minutes, during which time the other two-thirds are got ready.

In addition to this, about 35 machines could be carried in reserve store, thus making the total capacity of the *Bearn* up to 60 machines. The inferiority of the *Bearn* as regards landing arrangements to contemporary aircraft carriers in England and America is admitted.

Experiments in landing on deck of the *Bearn* were carried out in 1920, the method employed differing from the English method, which consisted of a net on the deck and hooks on the under carriage, in that the machine was stopped when at low speed above the deck, thus resembling the system employed on board the American *Langley*.

The delay in the transformation of the *Bearn* is regretted, and the opinion is expressed that the vessel with her low speed will never form a very useful unit of the fleet and is not worth the money to be spent on her. The vessel will doubtless, however, be most useful from an experimental point of view.

The *Bapaume* was launched in August, 1918.

Type: *Arras* class.
Displacement: 700 tons.
Total length: 75 meters.
Beam: 8.50 meters.
Draft: 3 meters.
Fuel: 145 tons.
Radius of action: 1,400 miles at 17.5 knots; 4,000 miles at 10.0 knots.
Speed: 17.5 knots.

The *Bapaume* is attached to the St. Raphael base. The vessel serves for training pilots to fly off from a limited space; the flying platform is similar to the platform placed on the tops of turrets in battleships during the war. The vessel has no military value.

The ship plane in the French Navy

The French were much behind the British in 1918; their navy was commencing on the lines adopted by the British in 1916. A plane

was flown off the *Paris* under way on October 26, 1918, and pilots were trained in fly off the *Bapaume*.

On board the *Bretagne* another system was adopted. Inclined rails were set up from the mast, down which planes traveled; this method was not, however, good, and a catapult system seemed better.

A catapult of American type is under construction to launch a plane weighing 1,500 kilos. It is therefore proposed to carry on board the new light cruisers machines to be launched by catapults of following characteristics:

Useful weight, 595 pounds.
Duration of flight, 5 hours.
Climb to 9,842 feet in 30 minutes.
Speed, 99 miles.
Weight, 3,086 pounds.
Biplace with W/T and 1 machine gun.

Later, when catapults are more developed, it is hoped to have machines of the following type:

Useful weight, 992 pounds.
Duration of flight, 3 hours.
Climb 11,482 feet in 40 minutes.
Weight, 4,409 pounds.
Power, 400 horsepower.
Fitted with W/T, photographic apparatus, and three or four machine guns.

Schools

The naval air service pilots' school is located at Berre, 16 miles northwest of Marseilles.

Staff: 10 officers, 300 enlisted of all grades, 110 students of all grades.

Equipment: 50 aircraft.

The French naval air service gunnery school is at Hourtin.

Staff: 5 officers, 200 enlisted of all grades.

Annual class: 60.

Equipment: 8 seaplanes.

The naval aerostation school is at Rochefort.

Staff: 23 officers, 200 enlisted men.

Equipment: 3 nonrigid dirigibles, 8 aircraft.

There is also a small school at Rochefort which uses a few seaplanes for instructional purposes.

	Credits granted for fiscal year 1925	
	Francs	Dollars at rate of 22 francs to $1
MAINTENANCE		
Article 1—Material		
Aerostation L A	2,673,000	121,500
Aviation H A	[illegible]	1,076,987
Common material	[illegible]	630,205
Formation of Pilots	745,000	33,864
Transportation and packing	84,047	28,347
Miscellaneous	100,000	4,545
Total of article 1	[illegible]	[illegible]
Article 2—Expendable Material		
Fuel and miscellaneous Material	7,785,000	353,863
Article 3—Installations and grounds		
Maintenance and installations of secondary order	650,000	29,545
Improvements and important repairs	461,800	21,127
Purchase and preparation of airdrome and grounds	589,400	26,791
Hangars	250,000	11,909
Barracks and quarters	910,000	41,364
Adjustment and liquidation of works, unforseen contingencies	865,000	39,255
Total of article 3	3,827,800	173,991
Total	[illegible]	2,432,263
NEW WORKS		
Aircraft, spare parts and service material	52,187,000	2,370,682
Bases (grounds and installations)	1,713,000	77,864
Total	54,100,000	2,474,546

GERMANY

VISIT TO NAVAL DOCKYARD AT KIEL

May, 1926

The plant was formerly entirely a naval dockyard, but has been divided into two parts: one, the smaller of the two, is under the administration of the navy and is called the naval arsenal: the other part belongs to the Deutsche Werke A. G., where commercial work in addition to naval work is being done. The latter, although partly owned by the Government, is a civilian concern entirely, but the navy has a naval constructor there (Oberbaurat) who oversees all work done for the navy. In the naval section only strictly military repairs are undertaken: these include artillery armament, torpedo armament, navigational equipment, radio equipment, optical equipment, including rangefinders, binoculars, etc., searchlights, electrical equipment. All other work, construction and machinery, is done by the Deutsche Werke A. G. In the arsenal there are at present 1,150 workmen, 130 clerical force, 120 officials (Beamten).

The Deutsche Werke employ at present a total of 5,700, but can employ up to 15,000; this is inclusive of their plant at Friedrichsort, where they manufacture railway motor cars (Triebwagen) which are run by gasoline motors and which are used extensively in Germany instead of electric trolley or motor cars. The dockyard also contains storehouses and supply depots where not only naval supplies are stored but a great deal of reserve material for the ships, such as guns, mounts, torpedoes, searchlights. In one storehouse were about fifty 8.18-centimeter antiaircraft guns, three 30.5-centimeter guns, twenty 28.0-centimeter guns, with breech mechanism for these guns; these are all reserve guns. A large number of torpedoes were being overhauled in the torpedo repair shop.

Vessels at the dockyard are the *Lothringen*, out of commission, converted into a mothership for mine sweepers, same as the *Preussen* at Wilhelmshaven; the old battleship *Zaeringen*, which is being fitted out as a target ship for distant radio-control experiments; and a number of destroyers (mine sweepers) from the division based at Swinemünde. The cruiser *Nymphe*, flagship of the commander of the Baltic force, was alongside a dock of the Baltic naval station headquarters. The *Elsass* is engaged in artillery training and goes in and out daily. The *Berlin* is undergoing a six months' overhaul at the Deutsche Werft, and the *Hessen* is also at the Deutsche Werft in dry dock under repair. This ship came out of dry dock on May 10, left the dockyard, and anchored in the harbor.

At the destroyer station Wik there were eight mine sweepers alongside the docks.

The naval academy at Kiel is no longer used as such, but is now the headquarters of the Baltic naval station. The naval accademy is now located at Flensburg.

The organization and purpose of the arsenal are as follows:

I. *Purpose.*—Base for all Baltic naval forces; furnishes same with material and supplies; equips all vessels of the Baltic station with material and supplies, including ammunition, nautical instruments, charts, etc.; keeps in condition those ships of the Baltic station that are out of commission; keeps up the armament of the vessels of the Baltic station. Supervises overhaul and repair work done by Deutsche Werke on vessels of the Baltic station.

II. *Administration.*—Naval captain is commander of the arsenal.

III. *Extent.*—Northern part of the former imperial dockyard, so-called Nordwerft, with Ellerbeck and Wik coal depots, and target station Friedrichsort. The naval supply stations Swinemunde and Pillau also belong to the arsenal.

IV. *Personnel.*—Five officers, 120 officials, 133 employees, 1,142 workmen.

V. *Organization.*—Central division with safety and fire department. Equipment and navigation division. Detailing of ships for supplying the vessels with oil and water, towing of targets, etc. Equipping the ships with nautical instruments and charts; administration of the storerooms for ship supplies (Schiffskammers).

Ammunition division has the following subdivisions: Artillery, torpedo, searchlight, fog devices, submarine telegraphy, gas protection, mine protection. These are combined under one administrative head. This system is different from that pursued at the former imperial dockyards and also the naval dockyard at Wilhelmshaven. It is hoped that it will result in better cooperation with the front and the interchange of experiences in the various ordnance divisions.

A naval officer acts as chief of division. The department is subdivided into artillery and torpedo divisions. The range-finder workshops are in the artillery division, the searchlight workshops, wireless telegraphy, submarine telegraphy, and fog devices in the torpedo division.

A staff officer is head of each division.

The ordnance division consists of the artillery and torpedo workshops, and gun and torpedo depots with their administration. The workshops are engaged principally in the repair and regular overhauling of armanent of the vessels and marine corps artillery, execution of adjustment work, installation of the armanent on the basis of new constructions, cooperating if necessary with the manufacturing firms.

Naval vessels before going to the Deutsche Werft for overhaul periods, have all armament and ammunition, including light batteries, removed at the arsenal; and these are later replaced here when the repair work is finished.

Technical division.—(a) Keeping out-of-commission ships and arsenal craft in condition, as well as the technical plants at the arsenal.

(b) Supervision of the work done on naval vessels by the Deutsche Werke.

Harbor division.—Keeping up the arsenal establishment and bridges in the harbor of Kiel. New construction work.

Administrative department.—Administration of main depot, arsenal treasury, chief accounting department, paymaster, and comptrolling department. In charge of all matters relating to employees and laborers.

VI. *Deutsche Werke.*—Former imperial dockyard, Kiel, with exception of the so-called Nordwerft and former imperial torpedo factory. Besides the repair work and new constructions for the

navy, the Deutsche Werke also builds merchant vessels and glow-head motors and does repair work on same.

There are dry docks in which ships up to 140 meters in length (former *Nassau* class) can be docked.

Very little ship-construction work going on here at present, only two oil tankers are under construction. A Danish freighter is under repair, and the former German cruiser *Niobe*, which has been stricken from the navy list, and which has been purchased by the Yugoslavian Government, is in dry dock and is being reconstructed into a training ship for that Government. Very extensive constructional changes are being made; the bow of the ship, which formerly was a long, protruding underwater ram, is being changed into a clipper bow. No armament is to be furnished here, and if there is any it will be installed later by the Yugoslavians elsewhere. This disposes of the *Niobe*, the disposition of which has puzzled me for some time.

There are six dry docks, four alongside of each other, from 300 to 360 feet in length, and two others, alongside of each other, 570 and 590 feet long. The battleship *Hessen* is in one of these. There are also three small floating dry docks.

Manufacture Diesel engines of all sizes up to 2,000 horsepower. Are constructing one of 2,000 horsepower and two of 1,000 horsepower, 6 cylinders, 4-cycle. These are being constructed for eventual orders for ships, as it takes from 12 to 14 months to build these motors, whereas a ship to contain them would take only eight months to build. The Diesel engines contain a special-type pump and scouring device, patented by this company. Build electric motors, boilers, and yachts, sailing and motor. No new yachts under construction at present, but a large number are laid up here, and a number of these are being overhauled.

A unique feature here are three large floating workshops, constructed of iron and permanently moored to the sea wall in the immediate vicinity of shops to which they are a necessary adjunct. It appears that these shops were necessary; and as there was not sufficient land available in the vicinity, these floating shops (houses) were built and permanently secured to the sea wall alongside the shops for which they were needed. They are quite large and completely fitted out for the purposes intended.

Was told that only two small steamers were under construction at the Howald Werke, and that the Germania Werke had practically nothing to do, no new constructions whatever. The latter is only a short distance from the Deutsche Werke.

GERMANY

AVIATION NOTES

The Focke Wulf A 16 d commercial airplane.

The Focke-Wulf airplane factory has recently produced a construction of remarkable performance, which represents a modified *A 16 b* type with certain important aero-dynamic improvements and a 120-horsepower Mercedes motor. A small traffic airplane must, of course, be particularly economic in its operation in order to balance the overhead expenses of short-distance inland air lines. But these inland lines frequently offer small and defective airdromes, especially in mountainous districts, which require a higher motor efficiency and a consequent increase of operative costs in order to insure safety in starting. The Focke Wulf *A–16 d* is especially designed to meet these requirements. It carries fuel for four hours, one pilot, and four passengers with a lesser fuel consumption as compared to the *A–16–a*, which carries one pilot and three passengers (?). The test flights made with the above load showed a climb performance of 3.3 m. sec. near the ground; 1,000 meters were climbed in 6 minutes, 2,000 meters in 14 minutes, and 3,000 meters in 25 minutes. The ceiling is 3,800 meters, the speed 162 kilo hr.—a remarkable performance for the given motor performance and load, which is due probably less to the increased motor efficiency than to the aero-dynamic improvements. The gliding angle is equal to 1 14 feet, a value which is not far distant from that of gliders.

After these trial flights, a load of 75 kilos (equaling one person) was added, and the running length was tested on sodden, clayey ground. It proved to be 128 meters. There was hardly any wind.

These experiments show the Focke Wulf *A–16–d* to be a highly economical commercial plane, peculiarly adapted for airdromes of imited dimensions.

[From the Leman press]

The Haw Airplane Propeller

The Haw propeller is all metal and is adjustable from pilot's seat in free flight at any desired number of revolutions.

The design of this propeller is based upon the principle of wheels adjustable when in rotation without the aid of interlocking cogwheels (toothed wheels), sun and planet wheels (epicylic gear), etc. In propellers of a similar type, it was found that cogwheels (1) make precision adjustment impossible, (2) that revolving toothed wheels very soon wear out, (3) that the weight of such propellers was 3 to 4 times the weight of an ordinary wooden propeller, although no metal blades were used.

In the Haw propeller the first point is that metal blades are used which have proved more satisfactory. The center of the propeller is fitted with a worm gear with corresponding shoulder thrust ball bearings. This worm gear runs on ball bearings at several points, so that it can be turned independently of rotation of the propeller either from the pilot's seat or from any other position. By the rotation of this gear a sleeve made of special material is moved forward or backward. Connecting rods run from the ends of this sleeve to the lower ends of the propeller blades, which are fitted with eccentrically arranged pins or lugs. By this means the adjustment is effected. The weight of these all-metal Haw propellers, adjustable when revolving, is only about 3 to 4 kilograms heavier than a normal wooden propeller. This comparison refers to 300-horsepower engines.

A remarkable feature of this design is that there are no propeller parts which might break down. The ball bearings themselves revolve without being subject to any kind of one-sided strain. The forward and backward pressure, effected by turning the worm gear, is taken up with absolute safety by the shoulder thrust bearings already alluded to. The blades themselves which revolve round their longitudinal axis, are likewise supported on ball and roller bearings.

The propeller requires no special attention, as ball bearings, as we know, once thoroughly lubricated function perfectly for a long time. Reliability in action of these Haw propellers is thereby amply safeguarded.

Now, these Haw propellers can be used to good advantage in aviation, it being possible to modify and adapt them to varying conditions as may be required. In taking off, in difficult terrain, in short confined aerodromes, and especially in unfavorable winds, the pitch of the propeller can be adjusted to the best angle to suit prevailing conditions, direct from the pilot's seat, thereby facilitating taking off. At high altitudes and in horizontal flight the propeller can be adjusted for higher speed. It is also possible to prevent the plane from "racing away," as the blades can be adjusted to act with a reversing motion.

Taking all in all, this Haw propeller has solved the problem of the propeller in the most favorable manner conceivable.

On actual test with motor at 1,400 revolutions per minute, a Haw propeller gave a pull of 800 kilos, while an ordinary wood propeller of same diameter and pitch gave only 672 kilos. On account of the peculiar hub construction, this propeller is easily convertible from tractor to pusher type. Due to lack of holes for bolts through hub, as in ordinary wooden-type propellers, greater strength on a better hub is obtained. Slight damage, as caused in ordinary usage, is

easily repaired with this type. In motor tests either in the field or on a block, the brake-type Haw propeller is easily changed for various horsepowers by removing or adding one or more strips.

New Dornier Factory on Lake Constance

The Dornier factory in Friedrichshafen has recently decided to establish a new airplane factory on the Swiss side of the Lake of Constance in Altenrhein. It is understood that the order has been given to the firm of B. Seibert, railroad and bridge builders, in Saarbruecken and Homburg Saar. The new plant will be ready for work in July of this year. The successful ocean flight of the Spaniard, Major Franco, has inspired great demand for Dornier "Wal" planes.

GREAT BRITAIN

NAVAL BASES AND STATIONS

June 15, 1926

The attached tables, compiled by O. N. I., give the latest available information on British naval bases and stations in the British Isles and in the dominions and colonies.

GREAT BRITAIN

NAVAL NOTES

[From the British press]

Cruiser-minelayer "Adventure"

The new cruiser-minelayer *Adventure*, the first surface man-of-war laid down for the Royal Navy after the armistice, is expected to be completed at Devonport dockyard in December next. The *Adventure* is the first fighting ship, apart from submarines, to be fitted with Diesel engines for cruising purposes.

Destroyers "Amazon" and "Ambuscade"

It is believed that the steam pressure of the *Amazon* and *Ambuscade* is 250 pounds.

NAVAL BASES, STATIONS, AND FUEL OIL STATIONS OF THE BRITISH EMPIRE. SHEET I. - BRITISH ISLES.

NAME.	NAVAL CLASSIFICATION AND FUNCTION.	DRYDOCKS, NUMBER AND DIMENSIONS OF LARGEST. NAVAL	DRYDOCKS, NUMBER AND DIMENSIONS OF LARGEST. COMMERCIAL	REPAIR FACILITIES AND BUILDING WAYS.	FUEL OIL STORAGE (BARRELS). NAVAL	FUEL OIL STORAGE (BARRELS). COMMERCIAL	IS IT DEFENDED	PERTINENT REMARKS.
1. PORTSMOUTH.	Large Naval Base with naval activities of all kinds, including Portsmouth Dockyard.	23 drydocks, including 2 floating. Largest: Length - 850 feet. Width - 110 feet. Depth - 45.7 feet.	One drydock. Length - 349 feet. Width - 50 feet. Depth - 17.6 feet.	Repairs of every description can be made. Has building ways for capital ships.	1,624,000	None.	Yes.	Portsmouth is the largest naval center in England. Large portion Atlantic Fleet bases here.
2. CHATHAM.	Naval Base, including Chatham Dockyard.	8 Drydocks. Largest: Length - 656 feet. Width - 84 feet. Depth - 33.6 feet.	None.	Repairs of all kinds for ships up to Light Cruisers, principally subs. Building ways for light craft.	Large. Amount not known.	None.	Yes.	Is base for submarines of Atlantic Fleet.
3. ROSYTH.	Large naval base, including Rosyth Dockyard. Rosyth yard now on care and maintenance basis.	5 Drydocks, including 1 floating. Largest: Length - 664 feet. Width - 110 feet. Depth - 38.8 feet.	None.	Repairs of every description for large ships could be made prior to closing.	3,236,000	None.	Yes.	Was primarily a battleship base before closing. Can dock largest naval ship afloat.
4. DEVONPORT (INCLUDES PLYMOUTH DISTRICT).	Naval base including Devonport Dockyard.	14 Drydocks, including large floating. Largest: Length - 730 feet. Width - 95 feet. Depth - 47.8 feet.	One drydock at Plymouth. Length - 452 feet. Width - 80 feet. Depth - 22 feet.	Repairs for all classes of ships. Building ways for large and small ships.	1,430,000	None.	Yes.	Has 35,000 ton floating dock which can take all capital ships except HOOD. Length - 680 feet. Width - 107 feet.
5. SHEERNESS	Naval Base for small craft. Includes Sheerness Dockyard.	6 Drydocks, including 1 floating. Largest: Length - 261 feet. Width - 61 feet. Depth - 26 feet.	None.	Repairs of all kinds to light craft.	1,715,000	None.	Yes.	Is present base for reserve minesweepers.
6. PEMBROKE.	Naval dockyard. Now closed, no work being done here.	1 Drydock. Length - 446 feet. Width - 75 feet. Depth - 25.3 feet.	3 Drydocks, including 1 at Milford Haven. Largest: Length - 600 feet. Width - 64 feet. Depth - 23½ feet.	Repairs to destroyers and submarines. Has two building ways for destroyers.	81,200	100,000 (est.	Yes.	Dockyard is now in care and maintenance status. (1926)
7. PORTLAND.	Naval base for light craft. Includes Portland Dockyard.	2 floating drydocks. Largest: Length - 680 feet. Width - 107 feet. Depth - 36 feet. Power - 32,000 tons.	None.	Docking only.	527,800	None.	Yes.	
8. PORT EDGAR (NEAR ROSYTH).	Destroyer base only.	None.	None.	Minor destroyer repairs.	112,000	None.	Yes.	Is present base for destroyers of Atlantic Fleet. Destroyers dock at Rosyth.
9. HAULBOWLINE.	Naval dockyard. Belongs to Irish Free State and is practically closed.	1 Drydock. Length - 624 feet. Width - 90 feet. Depth - 32.7 feet.	3 Drydocks (at Queenstown) Largest: Length - 541 feet. Width - 70 feet. Depth - 27 feet.	Large commercial repair plants. Most of modern machinery at Haulbowline removed by British.	126,000	None.	Yes.	Haulbowline is base for a few destroyers doing duty in Irish waters. Little activity.
10. THE NORE.	Naval Base without drydocks. Main base for Reserve Fleet.	None.	None.	None.	None.	None.	Yes.	Is a berthing and anchorage area for Reserve Fleet.
11. CROMARTY.	Operating base for Rosyth District.	None.	None.	None.	None.	None.	Yes.	
12. INVERGORDON (NEAR CROMARTY).	Naval fuel oil station.	None.	None.	None.	164,500	None.	Yes.	
13/ GRANGEMOUTH.	Naval fuel oil station.	None.	3 Drydocks. Largest: Length - 350 feet. Width - 51 feet. Depth - 24 feet.	Commercial dockyard and shipbuilding yard. Repairs up to limits of size of drydocks.	56,000	15,000	Yes.	
14. GLASGOW.	Naval fuel oil station.	None.	5 Drydocks. Largest: Length - 880 feet. Width - 83 feet. Depth - 26½ feet.	Large commercial repair and shipbuilding plants for all classes of vessels.	Not known (large)	300,000 (Approx)	Yes.	
15. HUMBER (KILLINGHOME)	Naval fuel oil station.	None.	Numerous drydocks at Hull and Grimsby nearby.	Repairs of every description at large Commercial dockyards at Hull or Grimsby nearby.	2,212,000	450,000 (Approx.)	Yes.	
16. HARWICH.	Naval fuel oil station.	None.	None.	Commercial repairs to small vessels.	35,000	None.	Yes.	
17. DOVER.	Naval fuel oil station.	None.	None.	Commercial repairs to light draft vessels.	81,200	55,000	Yes.	
18. LYNESS (NEAR SCAPA FLOW)	Naval fuel oil station.	None.	None.	None.	110,000 (Approx.)	None.	By light calibre guns	This station was in existence during the war.
19. RATHLULLIN (NEAR LOUGH SWILLY, N. IRELAND).	Naval fuel oil station.	None.	None.	None.	Not known (Small)	None.	Yes.	This station was in existence during the war.
20. SCAPA FLOW (ORKNEY ISLAND).	Protected naval anchorage.	None.	None.	None.	None.	None.	By light calibre guns	Was main advanced base for Grand Fleet during war.
21. LOUGH SWILLY (NORTH IRELAND).	Fortified naval anchorage.	None.	None.	None.	None.	None.	Yes.	Is an excellent protected anchorage.
22. BEREHAVEN (BANTRY BAY) (SOUTHWEST IRELAND).	Fortified naval anchorage.	None.	None.	None.	British navy had two 55,000 barrel tanks here during the war, but were offered for sale in 1922.		Yes.	Is an excellent protected anchorage.

NAME.	NAVAL CLASSIFICATION AND FUNCTION.	DRYDOCKS, NUMBER AND DIMENSIONS OF LARGEST. NAVAL	DRYDOCKS, NUMBER AND DIMENSIONS OF LARGEST. COMMERCIAL	REPAIR FACILITIES AND BUILDING WAYS. NAVAL	REPAIR FACILITIES AND BUILDING WAYS. COMMERCIAL.	FUEL OIL STORAGE, (BARRELS) NAVAL	FUEL OIL STORAGE, (BARRELS) COMMERCIAL	IS IT DEFENDED	REMARKS.
23. GIBRALTAR.	Naval base with naval dockyard.	4 drydocks. Largest (Length - 850 feet. Width - 95 feet. Depth - 35½ feet.	None.	Extensive repairs. Shops for all repair work.	Minor repairs by Commercial firms.	Large. (Amount not known)	42,000	Yes. Heavily.	Was very important base until Malta was made Main base for Mediterranean Fleet.
24. MALTA.	Large naval base with dockyard. Main base for Mediterranean fleet.	7 drydocks and one immense floating dock which can dock any ship afloat. See remarks.	None.	Repairs for all classes of naval vessels.	Minor repairs by commercial firms.	At least 500,000	100,000	Yes.	Malta is most important base in Empire. Dimensions of floating dock - length 1,000 feet, Width 180 feet, Depth Power- 65,000 tons.
25. SIMONSTOWN.	Naval base with dockyard. Base for Africa Station, British Navy.	1 drydock. Length - 756 feet. Width - 95½ feet. Depth - 36½ feet.	1 drydock at Capetown. Length - 529 feet. Width - 65 feet. Depth - 24½ feet.	Repairs and overhauling, light cruisers and below.	Minor repairs at Capetown, nearby.	75,000	120,000 (At Capetown)	By medium calibre guns.	Capetown is only 22 miles from Simonstown and is included in commercial facilities.
26. TRINCOMALI (CEYLON).	Naval base without dockyard. Base for East Indies Station.	None. Ships on station docked at Colombo.	None.	Only minor repairs.	None.	1,334,000 (When completed)	None.	No.	Base consists of excellent protected anchorage, fuel and supply stations.
27. HONGKONG.	Naval base with dockyard. Base for ships on China Station.	1 drydock. Length -574 feet. Width - 95 feet. Depth - 37 feet.	7 drydocks with 1200 ft dock building. Largest (At present) (Length - 767 feet. Width - 82 feet. Depth - 34½ feet.	Minor repairs to light cruisers and submarines.	Two very large commercial dockyards. with building ways ways for ships up to 10,000 tons.	210,000	285,000	Yes. Heavily.	Combined naval and commercial effort makes it an excellent base. Large coal reserve.
28. SYDNEY.	Naval base with dockyard. Base for Australian Navy.	2 Government drydocks. Largest (Length - 637 feet. Width - 84 feet. Depth - 32 feet.	3 drydocks, 2 small floating docks. Largest (Length - 850 feet. Width - 83 feet. Depth - 28 feet.	Normal repairs to light cruisers and destroyers. Major repairs at Government dockyards.	One large Government dockyard for repairs to all classes of ships. Government yard has built lightcruisers. Large Commercial dockyard.	142,000	240,000	Yes.	With the Naval, Governmental, and Commercial facilities, Sydney makes a fine naval base. Fine harbor.
29. AUCKLAND.	Naval base with dockyard. Base for New Zealand navy.	There is one drydock owned by city for use of Navy and Commercial ships. Length - 566 feet, Width - 80 feet, Depth - 33 feet.		There is one fair sized dockyard owned by city for combined use of Navy and Commercial ships. Repairs of all kinds to light cruisers. Two small private plants.		70,000	Navy tanks for Commercial use, also	Yes. (Obsolete)	Auckland has an excellent harbor. Is a good base for a small number of light cruisers.
30. ESQUIMALT, B. C.	Naval base with dockyard. Pacific base for Canadian navy.	There are two drydocks, owned by Canadian Government. Both for Naval and Commercial use. Dimensions of largest: Length - 1,150 feet, Width - 125 feet, Depth - 40 feet.		Minor repairs to destroyers.	One commercial repair plant for ordinary repairs.	5,000	None.	Yes.	Is a small, well protected harbor, excellent docking facilities, small supplies.
31. HALIFAX.	Naval base without dockyard. Atlantic base for Canadian navy.	None.	1 drydock. Length - 557 feet. Width - 89½ feet. Depth - 28 feet.	Naval dockyard closed but could be used in event of war.	Large commercial dockyard for large repairs. Building ways for 10,000 ton ships.	None.	190,000	Yes.	Halifax has a fine harbor, good supply and commercial repair and docking facilities.
32. BERMUDA.	Light cruiser naval base with dockyard. Base for North America and West Indies Station.	1 floating drydock. Length - 545 feet. Width - 93 feet. Depth - 33 feet. Power - 17,500 tons.	None.	Ordinary repairs to light cruisers.	Small machinery repair plant.	110,000	55,000	Yes.	Bermuda is not of any great importance as a naval base. Base for light cruisers and below, only.
33. BOMBAY.	Small naval station. Base for Royal Indian Marine.	Naval dockyard now reported closed. Had a drydock 640 feet long.	10 drydocks. Largest (Length - 1,000 feet. Width - 100 feet. Depth - 36 feet.	Only minor repairs.	Excellent commercial repairs to all classes of ships.	None.	105,000	Yes.	Could be made an excellent base on account of commercial facilities. Indian Navy is to be put on a more efficient basis.
34. FREETOWN (SIERRA LEONE, B.W.A.)	Naval fuel oil station.	None.	None.	None.	Minor repairs only.	120,000	None.	Yes.	Is a small, well-protected harbor.
35. PORT SAID.	Naval fuel oil station.	None.	1 small floating drydock. Length - 295 feet. Width - 61 feet. Depth - 18 feet.	None.	Suez Canal Co. and three private firms do ordinary repair work.	112,000	344,000	No.	
36. SUEZ.	Naval fuel oil station.	None.	1 Drydock. Length - 410 feet. Width - 73 feet. Depth - 20 feet.	None.	One commercial dockyard for ordinary ship repairs.	Some. Amount not known.	100,000	No.	
37. PORT SUDAN (ANGLO-EGYPTIAN SUDAN).	Naval fuel oil station.	None.	None.	None.	Small private dockyard for minor repairs.	168,000	75,000	No.	Is a small, well protected harbor on Red Sea.
38. ADEN (ARABIA).	Naval fuel oil station.	None.	None.	None.	Repairs of a minor character.	175,000	100,000	Yes.	Excellent harbor but unprotected from Southwest monsoon.
39. COLOMBO (CEYLON)	Naval fuel oil station.	None.	1 drydock. Length - 725 feet. Width - 84 feet. Depth - 32 feet.	Major repairs to naval ships on East Indies Station done here by private firms.	Three firms can undertake repairs of any kind up to size of drydock.	500,000	168,000	Yes.	Small harbor with excellent berthing facilities. Would make fine base for light cruisers.
40. RANGOON (BURMA).	Naval fuel oil station.	None.	None.	None.	Repairs to small ships only.	1,080,000 Total 720,000 Actual.	150,000	Obsolete.	Poor harbor. Owing to poor foundations for tanks, each tank filled only to 2/3 capacity.
41. SINGAPORE.	Naval fuel oil station. Work progressing slowly on new Naval Base.	None. (one floating dock being built).	5 drydocks. Largest (Length - 873 feet. Width - 100 feet. Depth - 34 feet.	None.	Repairs of all kinds to all classes of ships undertaken by Harbour Board.	5,460,000	150,000 (Approx.)	Yes.	Is most important fuel station for British Navy in Dominions. Dredging and clearing going on for new naval base.
42. KINGSTON, (JAMAICA).	Naval fuel oil station.	None.	None.	None.	Minor repairs only.	110,000	None.	Yes.	Is an excellent protected harbor. Could be made an advanced base.
43. PORT STANLEY (FALKLAND IS.).	Naval fuel oil station.	None.	None.	None.	Minor repairs only.	Some. Amount not known	None.	No.	Very small harbor. Could not be made a base
44. PORT LOUIS (IS. OF MAURITIUS)	Naval anchorage.	None.	One drydock. Length - 430 feet. Width - 52 feet. Depth - 20 feet.	None.	Minor repairs.	None.	None.	Yes.	Small protected harbor. Of little importance.
45. WEI HAI WEI (CHINA)	Naval anchorage and recreation area	None	None.	Minor engineering repairs.	None.	None.	None.	No.	Is an anchorage for medium draft ships only.
46. KING GEORGE SOUND (WEST AUSTRALIA)	Naval anchorage.	None.	None.	None.	Minor repairs can be made at Albany, nearby.	None.	None.	No.	One of finest harbors in the world. Undefended. Would make fine advance base.
47. PORT CASTRIES. (IS. OF ST. LUCIA)	Naval anchorage.	None.	None.	None.	None.	None.	None.	No.	Very small landlocked harbor. Very little importance.
48. ST. HELENA, IS. OF	Naval anchorage.	None.	None.	None.	None.	None.	None.	Obsolete.	Very poor anchorage. Of no importance.

Submarine "Oberon"

For the first time the Admiralty have decided that a submarine is to have a name instead of a letter distinguishing her type and a number. The submarine laid down at Chatham dockyard in March, 1924, following the construction of *X 1*, the largest submarine in the world, received the designation of *O 1*, but the Admiralty have issued instructions for her to be renamed *Oberon*.

The *Oberon* is being built from the designs of Sir E. H. Tennyson d'Eyncourt, the late director of naval construction, and is estimated to cost £590,513. She will be ready for sea in the spring of 1927.

GREECE

ACTIVITIES OF BRITISH NAVAL MISSION

[Source, M. I. D.]

The school of strategy and tactics, under Commander Talbert, has been closed down and the commander will return to his duties in the British Navy. As far as can be learned, a good many of the smarter students of the school have been withdrawn and it is understood that they were withdrawn for political reasons. President Pangalos has the habit of sending anybody on a foreign mission who is at all inconvenient to him and several of these officers have been sent off to various parts of Europe to study. The President has stated that Talbert could work for a lifetime on the men that were left in the school and that he could not teach them the difference between A and B, and he wondered how long he would stick at it. His intrigue has been answered by the fact that the school has been closed down.

It has also been learned that Admiral Townsend took the fleet out on several occasions and gave them a pretty hard grilling around, which disgusted them tremendously, and that he reecived an intimation that if he wanted to hold his job he had better be a little less strenuous, a hint which appears to have been taken. The life of the British naval mission will probably not be a very long one.

ITALY

MISCELLANEOUS NOTES

Naval maneuvers, 1926

The naval exercises which will take place this year in the Tyrrhenian will begin on June 22, 1926, at 8 p. m., in the presence of H. R. H. the Crown Prince, who will embark on the flagship *Cavour*.

These exercises will consist of tactical problems in which the navy will be divided into two opposing forces, Red and Blue. There will

be three exercises: The first to begin in June, the second and third to be carried out at the end of July and August, respectively. The first problem will be: The home forces (Blue) are scattered at various ports from Spezia to Palermo. They plan to unite to face the enemy (Red) who is concentrated at Maddalena (Sardinia). Blue must effect the connection without giving Red the opportunity of beating one of the two groups when it is alone.

The distribution of the forces for this problem is as follows:

BLUE

Palermo: *Cavour* (battleship); *Marsala*, *Bixio*, *Pantera*, *Tigre* (light cruisers); two flotillas of destroyers.

Messina: Three submarines, H class.

Naples: Three submarines, F class.

Spezia: *Giulio Cesare* (battleship); *Leone* (light cruiser); five destroyer squadrons.

Gaeta: *Quarto* (flotilla leader).

Orbetello: The one hundred and forty-first seaplane squadron.

Ciampino: The *N-2 dirigible.*

RED

Maddalena: *Doria*, *Duilio* (battleships); *Ancona*, *Venezia*, *Brindisi*, *Rossarol* (light cruisers); one flotilla of destroyers, *Falco* class; six destroyer squadrons; six submarines.

Terranuova Pausania (near Maddalena): The one hundred and forty-sixth seaplane squadron.

Vice Admiral of the Fleet Simonetti, commander in chief of the naval forces, commands Blue: Vice Admiral of Squadron Mola, commander of the destroyer squadron, commands Red. The exercise will continue until noon of June 25, unless an engagement between the main bodies or a crushing superiority gained by one of the parties by means of successful submarine attacks puts, naturally, an end to operations.

Destroyer "Sauro" launched

On May 12, 1926, the destroyer *Nazario Sauro* was launched in the Odero yard at Sestri Ponente (near Genoa).

Catapult for "Cavour"

It has been ascertained from a reliable source that the Cagnotto type, compressed-air catapult has now been perfected to the point where it can be relied upon for successfully launching seaplanes up to the size of the Macchi 18.

A Cagnotto catapult is now being installed on the battleship *Cavour* for service trials with a Macchi 18 seaplane, with folding wings. After trials of the catapult installation on the *Cavour*, it is intended to place similar installations on all Italian battleships.

New naval corps established

A draft of a bill introducing important changes in the organization of the Italian Navy was approved by the Council of Ministers on May 8, 1926. This bill will provide for the merging of the construction corps and the engineers' corps into a single corps which will be called "Genio Navale" (Naval Engineering Corps), and for the constitution of the new corps of naval arms. The following notes on the new corps were communicated by the ministry to the press.

The naval engineering corps

One of the oldest and most difficult problems of naval organization which all countries have had to face was the problem of the engineers. Engines have assumed an ever-increasing importance on the ships, while the status of the engineers remained stationary. When the engineers were first instituted, only practical qualities were required of them, but in a high degree. Their career, which began with studies of no great extent at the Venice school, developed itself mainly in the grade of petty officer. It was thought sufficient that the engineer should know how to handle an engine and be a good mechanician. But engines became always more highly developed and complicated; hundreds of men were placed under the engineer officer, who came to be, in reality, a man of the first importance on board ship; but current opinion stuck pertinaciously to the original conception of the engineer's rôle.

A first attempt at a solution of this discrepancy between the actual and the relative position of the engineer was the 1911 act which made officers of the engineer corps go through a naval academy course of instruction, ending with a diploma of equal value to that of the line officers. This appeared at the time a good idea; line officers and engineers, coming from the same school, would have between them a bond of fellowship which would insure greater harmony in the command. But the result was not as expected; while the problem of prestige was solved, while the engineers acquired the military qualities required for the handling of the masses of personnel under them, they always remained in practice the men who looked after the engines; and this form of inferiority was the more difficult to suffer just on account of that origin and school training which they had in common with line officers. No compro-

mise could remedy this condition of things. To facilitate the officers' career, the high grades of the engineers' corps had been overfilled; an artificial and harmful inflation ensued, which charged upon these officers functions and duties which really belonged to the Construction Corps. The result was that, on the one hand, engineer officers had to face problems for which they had not received the proper education, and on the other hand constructors were prevented from studying at first hand those engines which are such an important part of ship construction.

The radical measure approved by the Council of Ministers is the result of a long period of study, in which all the aspects of the question have received careful attention. The two corps of engineers and constructors will be merged into one. The engineer officer is to be an engineer who will have under him other officers and petty officers, whose educational level is not that of designers, for the practical handling of the engines. After a certain number of years afloat, his career will continue as a superior officer of the construction corps, and he will fulfill all the duties which are now intrusted to that corps, bringing to the solution of all problems his practical experience abroad ship which is undoubtedly superior to that which the present constructor possesses.

The corps of naval arms

This new organization is born of new requirements. Naval arms are growing every day in power and technical perfection. Every new invention or discovery is immediately applied to the use of the navy, which must be up to date if it is to be at all. The study and construction of naval arms therefore require a trained personnel which should devote its energies to them and to them only. The line officer will always be the man who uses the naval arms, the man who knows them and turns them to the most efficient purpose, but his multifarious activities—his very function as general staff officer—prevent him from being the constructor of naval arms.

Up to now this service has been intrusted to line officers who showed special ability for this branch of naval studies and who did not wish to follow the natural career of their corps. They have rendered and they still render valuable services, but it is clear that a system which relies upon volunteer enlistment in the "corps of specialists in the naval arms," as it was called, could not insure a uniform working of the service nor guarantee that those most fitted for that service should enter it.

The officers of the new "corps of naval arms" will be recruited among engineers who will have been through a course of instruction at the naval academy, in which they will remain a number of years side by side with their fellows, the line officers and the engineer offi-

cers. Like the latter, they will obtain their engineer's degree in a State university and they will embark for a number of years in order to acquire practical experience in addition to their technical training, an essential condition to the performance of good construction work.

Planes and personnel re Schneider cup race

The following information has been ascertained and verified from sources believed to be reliable.

The Macchi Co. is building two new seaplanes for the Schneider cup race on October 29, 1926. These are twin-float monoplanes, powered with modified Fiat A–22 engines. No other new planes are being built in Italy for this race. It is presumed that the third entry will be one of last year's racers.

The new Macchi racers are not yet ready for flight tests. The following pilots have very recently been ordered to the Macchi plant at Varese for training on last year's racers (the M–33's): Major De Bernardi, Commander Guasconi, Commander Centurione, Cavaliere Bacula, reserve pilots, Sergeants Salminci and Ulivi.

It has not been possible to obtain any further information to date, as, naturally, the Italians are taking precautions to prevent the leakage of any information pertaining to their Schneider cup entries.

Norge's sister ship afire

The dirigible *N–3*, a sister ship of the *Norge*, in which Capt. Roald Amundsen and Lincoln Ellsworth flew over the North Pole, was badly damaged June 16 when a fire broke out while her gas bag was being emptied.

The gas bag was burned up within a few minutes, but quick work by her builders at the Clampino hangar prevented the flames from spreading to other parts of the airship.

The *N–3* was constructed for the Japanese Government and was scheduled to be delivered this summer, possibly by Col. Umbretto Nobile, who was in command of the *Norge*.

Although the damage was estimate at 200,000 lire, no essential parts of the dirigible were damaged, and it will be rebuilt. There were only 300 cubic meters of gas, of a total of 7,000 meters, in the bag when the fire began.

The origin of the fire is unknown. The *Esperia*, the *M–4*, and the *N–2*, which were in the same hangar with the *N–3*, were not damaged.

An official inquiry has been opened.

Proposed round-the-world flight by Pinedo

Commander De Pinedo is making definite preparations for a flight around the world in a Dornier-Wahl seaplane. The plane is now under construction at the Dornier plant at Marina di Pisa and is scheduled to be completed about the end of July. It is to be equipped with two Isotta Fraschini ASSO engines, with metal propellers.

The exact route and itinerary are now being worked out. Commander De Pinedo is making a careful study of the topography of the United States in order to choose the most feasible seaplane route across the country.

It is understood that the general route around all the world will be as follows:

Rome—France—Canada—east coast of United States—across United States to California—Hawaii or Samoa—Philippines—Japan—return to Italy over approximately the same route taken by him in the *S-16-ter* in 1925.

JAPAN

NAVAL NOTES

"Kirishima," "Hiyei," and "Mutsu"

It was noted that there are no internal turrent range finders on the *Kirishima*, but on the top of No. 2 turret is a permanently mounted metal covered range finder.

No. 2 and No. 3 turrets of the *Hiyei* were fitted with internal range finders.

The *Kirishima* is still fitted with net booms.

Apparently kite balloons are still used on capital ships, since an apparatus of English manufacture fitted with gasoline-engine winch used for kite-balloon control was seen undergoing overhaul in one of the shops of the aircraft repair depot, and statement was made that this gear belonged to one of the battleships.

No signs of aircraft or aircraft-handling gear seen on *Mutsu*, *Hiyei*, or *Kirishima*.

To expedite launching of 10,000-ton cruisers

The following is a translation from the Japanese press on the above subject:

The noncapital ship-building program of the Japanese Navy is scheduled to be completed during the fiscal year 1928–29, the estimated completion of ships being as follows:

1926–27 2 cruisers (7,100 tons), *Furutaka* and *Kako*.
5 destroyers.
7 submarines.
1 airplane carrier (27,000 tons), *Akagi*.

1927–28 2 cruisers (7,100 tons), *Aoba, Kinukasa.*
5 destroyers.
7 submarines.
1 airplane carrier (27,000 tons), *Kaga.*
1928–29 4 cruisers (10,000 tons), *Myoko, Nachi, Ashigara, Haguro.*
All the remaining ships of the program.

Yearly proportionment of expenditure:

1926–27	¥80,000,000.
1927–28	75,000,000.
1928–29	68,000,000.

According to the above, the 10,000-ton cruisers will be completed during 1928–29, and the dockyards in Japan that are equipped to build 10,000-ton class ships are those at Kure, Yokosuka, Kawasaki, and Mitsubishi yards; therefore, if the navy is to start on the ¥299,000,000 replacement program during 1927–28 and lay down the four 10,000-ton class cruisers called for in that program in 1927–28, there will be a shortage of building ways; and the navy has been studying how to get around this. Due to shortage of funds it will be impossible to shorten the time of completion of the *Myoko* and other cruisers; yet, however, if the ¥299,000,000 replacement program is to be completed on time, by 1930–31, the Japanese Navy must lay down the cruisers in 1927–28. The only possible way out of this will be to expedite the launching of the cruisers now under construction in order that the docks may be cleared for the laying of the new cruisers, and this the Navy Department has decided to do.

The present building program, which is to be completed during 1928–29, was formulated after the Washington Conference, and as compared to the old program is a decrease of 2 cruisers, 13 destroyers, and 24 submarines, the particulars of which are as follows:

Length of program: From 1922–23 to 1928–29 (was postponed one year by earthquake).

Class of ships and number:

Cruisers, four 10,000 ton, four 7,100 ton; 68,400 tons.
Destroyers, 24 first class; 33,600 tons.
Submarines, 4 large, 18 medium; 28,166 tons.

In addition to the above, four destroyers authorized by the Fifty-first Diet are also scheduled to be completed by 1928–29.

The following information received from a reliable source is of interest:

10,000-ton cruisers

Length	600 feet
Beam	60 feet

Triple-hull construction is provided, including underwater blister.

To the inner hull is attached armor plate covering the main engine and boiler compartments. Between the inner hull and the outer hull are double bottoms which are filled with fuel oil.

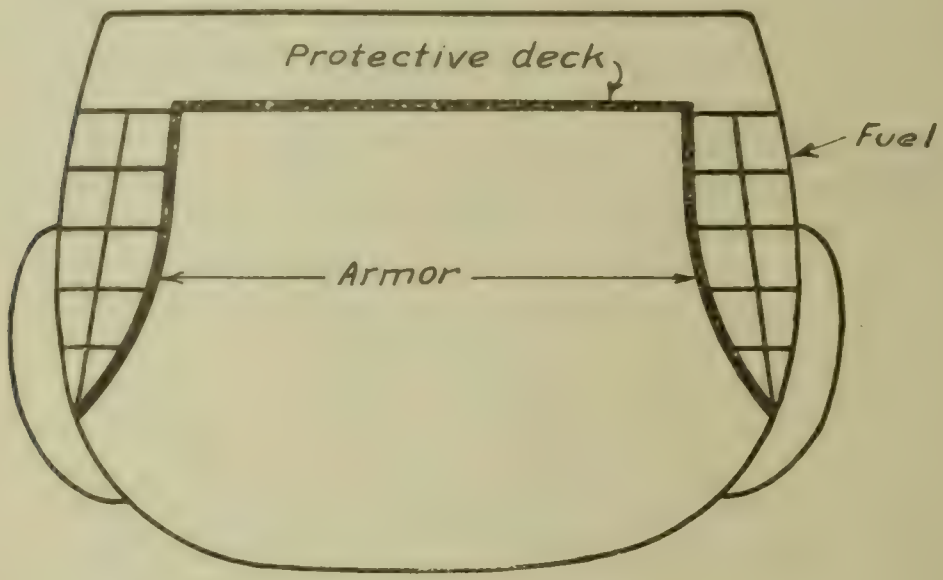
Over the main engine and boiler compartments is an armored protect on deck

The vertical and horizontal armor plating is of maximum thickness of 2 inches.

The blister does not extend beyond the boiler and main engine compartments.

A general idea of the hull construction is shown by the sketch.

Bunker capacity for 2,000 tons of fuel oil is provided. No coal will be carried.



New Cruisers,
10,000 Tons.
7,100 Tons.

The 12 boilers will be fitted for burning oil only.

The turret barbettes are of 1½-inch armor.

7,100-ton cruisers

The general hull construction is similar in design to the 10,000-ton class.

The armor plate has a maximum thickness of 1½ inches.

The blister is very narrow being not more than 1½ inches thick.

Fuel capacity is 1,200 tons fuel oil and 400 tons briquette coal.

The magazines are designed to carry 100 rounds of 8-inch per gun, a total of 600 rounds.

Aircraft launching device

From information received it appears that the 7,100-ton cruiser *Furutaka* has been equipped with a device somewhat similar to a

catapault for launching aircraft from the deck. No details of this device are obtainable as visitors are not permitted to inspect the *Furutaka*. However, the general principle is as follows: The plane is run out of the hangar on deck onto a moving platform through the center of which runs a track. This platform in turn moves across the deck on an arced track. When the platform is well outboard, the tracks on the platform line up with the tracks on a platform on top of No. 4 turret and the intervening space is bridged with a hinged section, also containing tracks, from the first platform to the turret platform. Thus is formed a straight track 75 feet in length and the plane and car are moved aft to the after end of the track and locked in place. The car is mounted on eight wheels which run on two lower tracks and two upper tracks. The lower track is level but the upper track slopes downward to the forward end. As the car carrying the plane moves down the track, the general path of the car is slightly downward and forward, but due to the construction of the elbow-like members of the car connecting the upper and lower sets of wheels, as the car approaches the forward end of the track, the forward end of the car is raised and at the time of plane release is level. This action imparts an upward force to the plane as it leaves the car and lessens the chances of the plane diving over the end of the track due to insufficient speed. There is no motive force applied to the car, the only power coming from the aircraft engine which is run wide open before the car is released. The car is stopped at the end of the track by a pneumatic brake. It is stated that the speed attained is 50 miles per hour. One report stated that a successful trial had been held and another contradicted this statement saying that no trial had been held.

As the first and largest platform has a very limited arc of movement due to the fixed deck track and as the large platform has to be aligned with the turret, only a very small arc of fire is available. It was stated that the release could only take place when the track was 25 to 30 degrees off the bow. Due to the small arc of fire, the ship must necessarily perform an excessive amount of maneuvering to bring the apparent wind down the launching track.

Asahi to be converted into repair ship

According to the Japanese press, the *Asahi* will be converted into a repair ship. The *Asahi* will go into dock at Kure in July and her present 12 boilers will be replaced with 4 new type boilers. The work on the *Asahi* will be completed by October. The *Asahi* will do duty as a repair ship until 1930–31 at which time it is expected that the repair ship to be provided for under the new building program will

be completed. The repair ship is to be constructed in one of the private shipyards.

Destroyers Nos. 31 and 32

Destroyer *No. 31* (1,445 tons) was launched at the Maidzuru naval station on May 15, 1926.

Destroyer *No. 32* is under construction at the Sasebo navy yard. The hull of this destroyer is about 90 per cent completed. Outer hull plates and supporting frames and angles are of galvanized iron. A scrutiny of the hull shows no signs of underwater sound receiving or transmitting apparatus.

Fleet submarine "I–52" and miscellaneous submarine information

The fleet submarine *I–52* is building at Kure navy yard. As previously given this submarine is of 1,400 tons displacement and is designed to make 21 knots with two 3,000 horsepower Sulzer engines. The sketch shows the general appearance of this submarine.

The *I–52* is of double-hull construction extending well forward and aft. The top of the outer hull stops at about 2 feet above the water line and forms a pronounced shelf. Above the outer hull is the free flooding and venting superstructure. The bow is high and flaring and is somewhat similar in appearance to the bow of the British submarine *K–12* as shown on page 80, Jane's, 1925.

The deck of wood is wide and flat and provided with wood fore and aft strips.

Anchors: Two ordinary patent anchors, one on each bow.

Bow rudders, large and of very heavy and rugged construction: housing in superstructure and rigging out from aft forward.

Listening device: One Y tube at bow; no loop antennæ.

Clearing wires: Two clearing wires extend from the bow to the stern.

Net cutter: None.

Capstan: One forward.

Radio masts: Two metal tapered masts folding aft.

Signal mast: One metal telescopic mast on bridge.

Running lights: Permanent.

Gun: One 4.7-inch wet mount (forward of bridge on sponson equipped with metal spray shield).

Hatches: Only two seem located as shown in sketch.

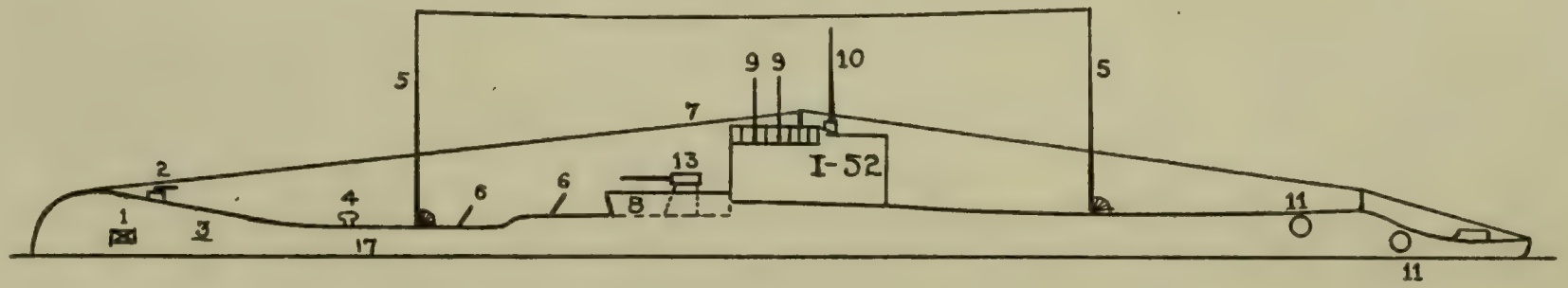
Bridge: Large, semichariot with glass windows in forward half. No conning tower eye ports. Metal roof over forward part.

Periscopes: Two tapered housing, forward periscope on center line, after periscope *off center line to port.*

LEGEND	
1.	Patent anchor
2.	Y tube
3.	Bow rudder
4.	Capstan
5.	Folding masts
6.	Hatches
7.	Clearing wire
8	Spray Shield
9.	Periscopes
10	Mast for flag signals
11.	Exhaust opening
12.	Vertical rudder
13	4.7" gun

FLEET SUBMARINE I-52

1400 tons surface
21 knots speed.



Engine exhausts: Two each side located as shown in sketch. (Apparently these two exhaust vents permits cutting out muffler.)

Towing pendant: One wire pendant made fast near bow with pelican hook. Releasing wire runs from pelican hook to inside pressure hull so as to allow release of pendant from inside pressure hull.

Marker buoy: Housed in superstructure port side forward of gun. Painted white and red horizontal stripes.

Draft (actual): 15 feet forward, 16 feet center, 18 feet aft.

Propeller guards: At stern one on each side.

Vertical rudder: Balanced.

Antiaircraft gun: None.

NOTE.—About half way between bridge and bow on each side is painted the number 17 in white, this denoting the seventeenth submarine division. "52" is painted in white on each side of bridge.

I–1 class

Length, 319 feet 10⅝ inches; beam, 29 feet 7⅛ inches; draft, 17 feet 4⅝ inches.

Motors: Two of 900 horsepower each.

Radius, at 13 knots, 8,000 to 9,000 miles.

Crew, 60 (officers and men).

Comments.—It will be noted from the above description and sketch of the *I–52* that there is considerable difference in construction and appearance between this submarine and the experimental fleet submarine *I–51*. The *I–51* has a different shaped bow, is a single hull submarine, no spray shield around gun sponson, somewhat different bridge, and has four 1,300-horsepower engines.

998-ton class

The *Ro–63*, *Ro–64*, and *Ro–68* were recently seen from a distance at Sasebo navy yard.

The following equipment was noted:

(*a*) No gun.

(*b*) Loop antennae.

(*c*) Clearing wires.

(*d*) Two tapered housing periscopes.

(*e*) Two telescopic metal masts for radio antennae.

(*f*) Deck Y tube forward.

Information has been received to the effect that the storage batteries of the 998-ton class Japanese submarines are of 2,400 ampere-hours capacity.

Second replacement program

[From the Japanese press]

While the question of the replacement program involving an expenditure of ¥299,000,000 is still troubling the Navy Department, the second replacement program which must be started by 1930–31 is another question which is confronting the Navy Department.

There are some officials in the department who argue the advisability of starting the second replacement program of auxiliary ships before the construction of capital ships which starts in 1931–32; however, if the second auxiliary replacement program is not started prior to 1931–32, it will mean that during the year 1931–32 no ship will be completed. The navy will, however, try to have the second auxiliary replacement start in 1930–31, though this may be a serious drawback in obtaining the authorization of the ¥299,000,000 program.

Under the present program three years is the time allowed for the construction of a destroyer, but in the future this will be reduced to two years, therefore those destroyers that are to be completed in 1931–32 work will have to be started in 1930–31. If the second auxiliary replacement program starts in 1930–31 the construction of several destroyers scheduled under this program will be started in 1930–31, and the first apportionment under this program will be ¥20,000,000. This will greatly increase the appropriation for 1930–31, and the fate of the ¥299,000,000 will be in danger. The navy has insisted that the ¥299,000,000 program must be completed by 1930–31, but it is likely that they will yield to postponing this program one year until 1931–32, as a sacrifice for the approval of the second auxiliary ship program which starts in 1930–31.

The ships that will have to be replaced in 1931–32 and 1932–33 are as follows:

In 1931–32—First-class destroyer *Tanikaze;* second-class destroyers *Momi, Nashi, Take;* submarines *Ro–1, 2, 13, 14, 24, 51.*

In 1932–33—First-class destroyers *Minekaze, Sawakaze, Okikaze, Shimakaze, Yakaze, Kaki, Toga, Kiku, Hishi;* submarines *Ro–15, 19, 20, 25, 52, 53, 54.*

It therefore follows that in 1930–31 an appropriation of over ¥20,000,000 will be required to start the construction of at least four destroyers and six submarines as a part of the second auxiliary ship program.

The Navy Department is anxious to have the ¥299,000,000 replacement program approved next year, but there is danger that the Finance Department may propose a decrease in the number of ships to be built under the program or to extend the completion of

the program by one year. However, the Navy Department is opposed to this, as it will greatly increase the appropriation for the fiscal year 1931-32 and will overlap with the construction of capital ships and the second auxiliary replacement program which start about the same time.

The yearly proportionments from 1926-27 to 1930-31, including the old program, destroyer program, and the program to be started next year, are as follows:

Year	Old	Destroyer program	1927-1931 replacement program	Total
	Yen	*Yen*	*Yen*	*Yen*
1926-27	80,000,000	8,000,000		88,000,000
1927-28	75,000,000	10,270,000	30,000,000	115,270,000
1928-29	68,000,000	7,830,000	39,000,000	115,030,000
1929-30			115,000,000	115,000,000
1930-31			115,000,000	115,000,000

LATVIA

MISCELLANEOUS NOTES

[Source reliable]

New naval trawlers

Latvia has under construction in France at present two trawlers; these will be ready for delivery in August and the *Virsaitis* will leave for St. Nazaire on about August 10 to convoy them to Riga.

Specifications: Tonnage, 250; mine capacity, 30; armament, one 3-inch Skoda gun, which can be used both as flat trajectory and as antiaircraft weapon; four machine guns.

Coast defenses of Riga

The coast defense artillery comprises at present eight Russian 6-inch Canet guns; of these three are mounted at Dunamunde (less at present one gun, shipped to the United States for test of the new shells being manufactured by Bethlehem) and the remaining five, now under repair at the Riga arsenal, will be set up at Dunamunde when repairs are completed before next winter.

Plans for additional ordnance for coast defense provide for possible purchase of 4-inch antiaircraft guns, to be set up at Libau, of such type that they can be used not only for antiaircraft purposes, but also on occasion as flat-trajectory secondary batteries for coast defense. These plans are very indefinite, and purchase in the near future is not contemplated.

MEXICO

NAVAL NOTES

New naval construction planned

A Government official has stated that the Federal executive has signed a contract with the German firm of Schichauwerke, of Elbing, for the construction of a large dry dock in the port of Vera Cruz, to cost 3,000,000 pesos, and which will be capable of handling ships up to 1,500 tons register.

He further stated that the Government has contracted with the German house mentioned for the construction of 10 small gunboats, capable of 20 knots, and armed with guns of 57 millimeters and machine guns of 7 millimeters. According to the official, these craft must be handed over prior to the end of the current year, and they will be handed over to the Mexican customs authorities.

The Government's naval program was stated to include also the construction of 10 larger craft, of 260 tons each, armed with 75-millimeter guns and will be distributed half on the Gulf of Mexico side of the Republic and the remainder on the Pacific coast; these will be used especially for chasing contrabanders.

Finally it was stated that the Government has contracted for the purchase of 10 hydroavions, of 360-horsepower engines, which will also be placed in the customs service.

Personnel strength of navy

The following figures show the latest statistics on the regular personnel of the Mexican Navy:

Officers of flag rank	4
Captains, commanders, lieutenant commanders, lieutenants	49
Junior officers	114
Enlisted men	418
Total	585

NETHERLANDS

NAVAL NOTES

Speed trials of cruiser "Sumatra"

H. M. S. *Sumatra* has recently completed her official trials, and from reports received the trials were successful. The *Sumatra*, on a six-hour speed trial, maintained 31.8 miles and developed about 83,000 horsepower. On the durability test of 30 hours she maintained 12 knots on about 23,000 horsepower.

It is expected that this vessel will be placed in commission early in June.

Dutch East Indies naval expenditures

The following shows the expenditure for 1925 and the estimated expenditure for 1926 for that portion of the Royal Dutch Navy stationed in the Dutch East Indies:

	1925		1926	
	Gross	Net	Gross	Net
	Florins	*Florins*	*Florins*	*Florins*
[illegible]	1,2[illegible]	1,2[illegible]	1,[illegible]	1,[illegible]
[illegible]	12[illegible]	12[illegible]	12[illegible]	12[illegible]
[illegible]	1,4[illegible]	1,4[illegible]	1,[illegible]	1,[illegible]
[illegible]	5,[illegible]	5,[illegible]	4,[illegible]	4,[illegible]
[illegible]	1,[illegible]	1,[illegible]	3,[illegible]	3,[illegible]
[illegible]	782,[illegible]	782,[illegible]	1,[illegible]	1,[illegible]
[illegible]	147,[illegible]	147,[illegible]	129,[illegible]	129,[illegible]
[illegible]	11,[illegible]	10,[illegible]	12,093,282	12,379,282
Total	22,[illegible]	21,519,243	28,842,112	29,108,112

NETHERLANDS

NAVAL AIR SERVICE

The following description of the naval air service of Holland and East Indies gives cognizance of material and general administration, principal stations for land and sea planes, training and selection of personnel, and list of all planes belonging to the Dutch Navy.

HOLLAND

The naval air service of Holland is directly under the navy department. The chief of material has cognizance of the material, and the general administration is under the marine general staff, one member of which is a flight officer.

The principal seaplane station in Holland is at De Mok (Texel) and is commanded by Commander F. J. Heeris, a nonflyer. He has a flight officer who is his technical advisor. All training in seaplanes is carried on here.

The principal naval station for land planes is at De Kooy (near the Helder) and is under the command of Commander J. P. Remijnse, a nonflyer. There is a landing field, six hangars, flying school, and necessary shops. All naval training in land planes is done here.

In addition to the above, there are stations at Schellingwoude (near Amsterdam), flying station for seaplanes; Veere (Zeeland), seaplanes; Souburg (Zeeland), land planes.

It is the policy of the Government to abolish seaplanes for service in Holland and to rely solely upon land planes.

DUTCH EAST INDIES

All naval activities in the East Indies are confined to seaplanes. The principle seaplane station is at Soerabaja, where there are four hangars, runways, and necessary work shops. At Tandjong Priok there are two hangars and work shops. At Semarang there is one hangar.

TRAINING OF PILOTS

The course for pilots lasts about 18 months. All pilots are first trained in land planes and receive a certificate as an international vliegbrevet, which requires 50 hours solo. Upon the completion of this training a pilot must have 30 hours solo in seaplanes to obtain a navy certificate. There are four classes of pilots: Naval, special naval (temporary) (serve about eight years), petty officers, and conscript.

Observers are composed of naval officers and reserves, and the course lasts about 10 months.

Mechanics are trained from among the regulars and conscripts. The regulars receive two years' training and the conscripts eight months.

Appended is a list of all the planes belonging to the Dutch Navy:

List of all the airplanes belonging to the Dutch Navy

HOLLAND

No.	Type	Description	Engine	Remarks
20	van Berkel W. A. (Brandenburg).	2-seater reconnaissance, float plane.	BMW, 185 h. p.	Training.
6	Fokker CV	2-seater reconnaissance and light bomber, land plane.	Hispano-Suiza, 450 h.p.	
17	Fokker DVII	Single-seater scout, land plane.	BMW, 185 h. p., to be re-engined with BMW, 300 h. p.	Do.
11	Fokker CI	2-seater training, land plane.	BMW, 185 h. p.	Do.
18	Fokker GIII	2-seater training, land plane.	Mercedes, 120 h. p.	
2	Pander	Single-seater, land plane.	Anzani, 25 h. p.	Engines unsatisfactory.
12	Fokker CV	2-seater reconnaissance, land plane.	Hispano-Suiza, 450 h. p.	Building, Amsterdam; ready 1926.

DUTCH EAST INDIES

15	van Berkel W. A.	2-seater reconnaissance, float plane.	BMW, 185 h. p.	Training.
6	van Berkel W. B.	2-seater reconnaissance, float plane.	Rolls Royce, 365 h. p.	Do.
4	Fairey III D	2-seater reconnaissance, float plane.	Napier, 450 h. p.	Two for each light cruiser.
1	Fokker Fbl	4-seater reconnaissance, boat plane.	Napier, 450 h. p.	
5	Dornier Wal	4-seater reconnaissance, float plane.	2 Rolls Royce, 365 h. p.	Building, Italy; ready July 1926.
1	Fokker Fb	4-seater reconnaissance, float plane.	Hispano-Suiza, 450 h. p.	Building, Amsterdam; ready 1926.

It is proposed to order for 1927, for Holland, 12 Fokker CV's (land planes).

RUMANIA

DESTROYER REFIT IN ITALY

Two Rumanian destroyers, *Manaretti* and *Maresti*, arrived in Naples April 21, 1926, and will have a general overhaul at the Cantiere Navale Pattison. It is rumored that they may be regunned by Armstrong (Naples) with the 4.7 guns which are being mounted on the new Italian destroyers.

RUSSIA

CONDITIONS IN RED ARMY

Concerning the German battalions in the Red Army, the "Polska Zbroyna" states that the chief war council in Moscow has issued an order assigning the recruits of the "Autonomous German Republic on the Wolga" to the recently formed German battalions. The "Krassnaia Zvesda" writes that the German battalions are one of the best units of the Red Army.

The war commissary, Woroshilow, has ordered all the officers of the former imperial navy under 55 years of age to report themselves for service. This measure is probably inspired by the bad condition of the Soviet fleet.

The "Rul" writes from Moscow that 20 officers and men have been arrested on the armored cruiser *Marat* for resistance offered to the central committee of the Communist Party. The 178 officers of the Nineteenth Soviet Brigade who revolted last year in September have been tried, 33 being condemned to death and 143 to imprisonment for life; 16 officers, among them General Karpinsky, have already been shot.

Poster newspapers are being propagated in great numbers in the Red Army; poster newspaper offices have been instituted in each army section, battalion, squadron, company, and battery. These papers are written by hand or typewritten and are designed to promote military efficiency and discipline and to create a public opinion in favor of communistic schemes for military reorganization and soviet propaganda. One out of every ten soldiers is an active worker in the Red Army press, furnishing a total of 40,000 to 50,000 military correspondents. Six printed national army papers and four territorial militia daily papers were started in 1924–25.

A recent order of the revolutionary war council calls attention to the necessity of keeping up the glorious traditions of the Red Army by bestowing special signs of distinction upon the units who fought against the "White Guards" (Denikin, Wrangel, and Koltschak). These emblems of honor are to be worn on the sleeves, collar, and

helmets. The most popular of these glorious units is General Budjeny's cavalry corps.

The war council has ordered the transference of certan army units from the eastern military districts to the Polish frontier. The creation of a new territorial corps is contemplated for the strengthening of the western military districts.

The Soviet Government has accepted the invitation of the League of Nations to take part in the preliminary debates of the disarmament commission.

The Red Army has recently been reorganized. Each battery has been furnished with six guns; three batteries form a division and two divisions one regiment. The batteries of the infantry artillery have also been provided with six guns each. An infantry division has 54 guns, of which 18 are cannon, 18 howitzers, and 18 infantry guns.

SPAIN

FLOTILLA LEADERS

[From the British press]

When referring to the decision of the Russian Admiralty to order a number of flotilla leaders from Italian yards, we gave some comparative figures relating to their design and that of the French constructors, taking for the purpose the Italian *Leone* and the French *Chacal* types. The latter class has a normal displacement of about 2,360 tons, and is fitted with five guns of 5.1-inch caliber in single mountings, two 3-inch antiaircraft guns, and six torpedo tubes. The speed is 35.5 knots, and the vessels of this class have an oil-fuel capacity of 540 tons. The Italian flotilla leaders of the *Leone* type have a displacement of 2,200 tons, and mount eight 4.7-inch guns in pairs in shields, two 14-pounder, high-angle guns, and six torpedo tubes. Their speed is 35 knots, and they carry 400 tons of oil fuel. A comparison of these designs is now possible with the *Churruca*, the first of the Spanish flotilla leaders, which has just completed her trials, giving a mean speed of 37½ knots. There were indications that even this speed could be increased upon occasion, for some of the official runs on the measured mile at Cartagena were made at over 39 knots. These Spanish flotilla leaders are being constructed at Cartagena by La Sociedad Espanola de Construccion Naval, in which firm British experience is available and British practice is used.

The *Churruca* and her sister ships are twin-screw vessels of 320 feet length, with a beam of 31 feet 9½ inches, and a draught of 10

feet 6 inches. The normal displacement is 1,650 tons, and the machinery develops 42,000 shaft horsepower. They are armed with five 4.7-inch guns, one 3-inch antiaircraft gun, two sets of triple 21-inch torpedo tubes, and two depth-charge throwers. Their sea-keeping qualities are greatly improved by their high and long forecastles, which give better accommodation for the personnel than would be possible if a low bow were adopted. In Britain informed opinion seems to be convinced that the 4.7-inch gun meets all the requirements of the duties to be performed by this class of vessel. Five guns of this caliber, single-mounted, compare very favorably with the five 5.1-inch guns on the French vessels, and it is possible that, in service, the rate of firing of the *Chacal* will not prove to be so satisfactory as that of the *Churruca*. Again, it is doubtful, owing to ammunition supply, whether any real advantage would be gained by twin mounting the guns, as is done in the Italian-built *Leone*.

On the official trials at Cartagena on April 14, 1926, the speeds obtained were: Maximum, 39.76 knots, and average during a four-hour run, 37.64 knots. From the standpoints of speed, radius of action, and armament, these Spanish flotilla leaders appear to be superior to the French and Italian types, in which the armament does not seem to justify their high displacements with the loss of speed which accompanies it. The Spanish authorities are continuing the construction of vessels similar to the *Churruca*, and in a short time Spain will be able to display on the Mediterranean Sea the most interesting and the fastest group of flotilla leaders in service.

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In general: Bureaus of the Navy Department; all force commanders; all commanding officers of capital ships, the larger patrols, destroyers, and submarines.

WASHINGTON
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1926

FOR CONVENIENCE IN ROUTING

Officer	Initials	Date received	Date forwarded
CAPTAIN			
EXECUTIVE OFFICER			
GUNNERY OFFICER			
NAVIGATION OFFICER			
FIRST LIEUTENANT			
ENGINEER OFFICER			
ASST. F. C. OFFICER			
COMMUNICATION OFFICER			
MEDICAL OFFICER			
SUPPLY OFFICER			
FIRST DIVISION OFFICER			
SECOND DIVISION OFFICER			
THIRD DIVISION OFFICER			
FOURTH DIVISION OFFICER			
FIFTH DIVISION OFFICER			
SIXTH DIVISION OFFICER			
MARINE OFFICER			

The material for the Bulletin is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

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DUGUAY - TROUIN
8000 TONS

CONFIDENTIAL

O. N. I. MONTHLY INFORMATION BULLETIN

VOL. IX AUGUST, 1926 No. 2

ARGENTINA

VISIT TO PUERTO BELGRANO

The Argentine navy yard at Puerto Belgrano, formerly Puerto Militar, was recently visited. The purpose of the trip was to visit the *Rivadavia* and the naval air station. The *Rivadavia* was secured to the dock near the entrance from the river. On the arrival of the *Moreno* she will be secured to the dock just ahead of the *Rivadavia*. From the outside the *Rivadavia* appeared to be in good condition, none of the paint being damaged after her long voyage from Boston. The decks, however, did not give one the feeling of cleanliness expected, and had the appearance of a vessel in reserve, dull, and uncared for.

On the *Rivadavia* we were escorted through parts of the main deck, superstructure deck, and through the crew spaces, galleys, engine rooms, firerooms, and central station, later being taken into the No. 2 turret. While the upper decks were fairly clean, the lower decks were not particularly well cared for. The central station was in excellent condition, and is probably given more attention than any other part of the ship. One of the noticeable defects in the ship was the heavy paint on water-tight gaskets and knife-edges on water-tight doors and hatches. All accommodation ladders and the hatch combings were anything but clean. The ship's galley lacked care and attention, not alone in the compartment itself, but the galley range and copper kettles were more than neglected.

The engine rooms and firerooms had the appearance of being clean and well attended. Two boilers were in operation, one on each stack, although the ship was not using any power other than for lighting and heating that could be observed. Smoke was belching out of the stacks as though she were a coal burner making a speed run, caused possibly by inefficient operation of the burners, which were natural draft Bethlehem Steel Corporation type. No fuel-oil leaks were seen, but several steam leaks were observed.

The turret and the handling room visited were in very good condition; the turret, however, being extremely congested, owing to the new shell hoist recently installed, in accordance with the plans of the gunnery officer in charge of the reconditioning of the same.

Several days after the arrival of the *Rivadavia*, occasion arose to visit the chief of staff for the purpose of introducing an official of the Fore River Shipbuilding Co. At that time the chief of staff remarked to this gentleman that he had just returned from a visit to the *Rivadavia* and that the only comment he could make regarding the repairs was his dislike of the recently installed shell hoist in the turrets, owing to the congestion. It was explained to the chief of staff that it was only after a model had been built by the Fore River company that the hoist was installed and location was entirely outside of their control, as the design was that of the Argentine naval mission in the United States. He mentioned the fact that Lieutenant Commander Bustamento of the Argentine Navy had approved the entire scheme. The officer who accompanied us from Buenos Aires was the director of target practice of the Argentine Navy, who seemed to be satisfied with the installation, including the powder car and range finder, which blocks the head room in the rear of the guns.

The crew were in dungaree uniforms throughout the ship. The only blue uniforms worn by the men were those worn by the captain's orderly and the guard which received us. The crew was not at all smart. The officers were in blue uniform, except that some wore tan shirts and soft collars, while others were wearing white shirts and soft collars, but the commanding officer and two other officers were the only ones that I observed with white shirts and stiff white collars.

The inspection of the ship was finished about lunch time and we were guests of the senior officer present afloat, whose flag was flying on the *Rivadavia*. In going from one of the lower decks to the captain's cabin, we passed the crew lined up with tin plates and cups preparatory to receive the food, which is served cafeteria style. After lunch, which was in the captain's cabin, we left the *Rivadavia*, and under the guidance of the officer in charge of the aviation station we proceeded to the aviation field.

Several planes were operating with students and the crews assigned for upkeep were occupied with their duties. The aviation station, although not particularly large, is well equipped and the facilities are being constantly increased. The buildings consist of hangars, a well-arranged storeroom, which contains spare parts of aviation instruments and overhauled airplane engines, woodworking shops, and machine shops. A foundry was under construction and is expected to be in operation this year. The student officers have very comfortable quarters on the second floor of the administration building, which is built of brick and cement. Each student officer has a room about 14 by 12 with wardrobe, bed, writing desk, chair, small dressing table, steam heat, and electricity. A large-sized mess room

and library is on the same floor. On the lower floor there are butcher shops, bakeshops, canteen, and separate kitchens for officers and men.

The men's quarters were in a large building in the same vicinity and were very neat and clean and well cared for. Each man has a bunk made of steel piping of the Standee type. At present they are but two tiers in height. The mess room for the men has a capacity of about 400 and contains marble-topped tables with seating benches so arranged that when not in use they fold up underneath the table at right angles to the top, making a very neat appearance. It was observed that the food for the men had to cross an open space for a distance of about 100 feet from the kitchens in the officers' quarters. The shower baths and washbasins were provided in a separate room. Outside the building there were large concrete basins for washing clothes, and near by clothes lines for tricing up. The men had special steel lockers and steel hat boxes in which to keep their clothes, these being in the same room with the bunks.

The instructors in charge at the air station are graduates of Pensacola, Fla., and have for assistants a group of chief petty officers, graduates of the same school. The Argentine aviation instruction school at Puerto Belgrano has been in operation four years, and during that time two student officers have lost their lives.

Before completing the inspection of the station, we visited the photographic laboratory and were shown examples of aerial photography and survey work. It is proposed to survey the Argentine sea and river coasts with airplanes, and several photographs of the latest results were examined. The camera being used is a 12-inch aerial camera manufactured by the Eastman Kodak Co.

There are 16 airplanes in actual operation, including those for instruction, and about 50 planes in reserve. There are various types and classes. Among those noted were four Vickers amphibians purchased from the defunct Buenos Aires-Montevideo air service. These planes are not in particularly good condition, although it was stated that a very slight overhaul would make them efficient. Overhaul crews were working on the boat section of the Dornier planes purchased from Italy. The officer in charge stated that they were having no trouble at the present time with duraluminum, as the metal was first covered with varnish and later painted. He remarked that the slightest scratch permitted corrosion and that they were taking great care in preservation.

One Duff Dalland plane has been received by the aviation authorities equipped with pontoons and is being tried out before further deliveries are made from the States. To date, the results have been satisfactory.

ARGENTINA

MISCELLANEOUS NOTES

Transport "Bahia Blanca" departs with crew for Sarmiento cruise

The Argentine transport, *Bahia Blanca* (cargo vessel), left Buenos Aires June 8, for Liverpool, England, with midshipmen for a cruise on the *Sarmiento*, now completing repairs in Liverpool. Among the sailors designated as part of the crew for the *Sarmiento* is a conscript who is being rewarded by a trip around the world in the *Sarmiento* for his patriotism. The parents of the conscript did not wish him to enter the service. Nevertheless he walked 210 miles from his home to the nearest town where he could enter his name and comply with the conscription law. The itinerary for the *Sarmiento* is as follows: Liverpool, Madeira, La Habana, Colon, Balboa, Los Angeles, Honolulu, Yokohama (Japan). From there the men will entrain for Tokio, Kobe, Singapore, Manila, Madagascar, Cape City, and Buenos Aires.

Visitors prohibited from radiotelegraphic stations

From the 22d of April, 1926, all data pertaining to the radiotelegraphic installations of the boats, coast stations, and arsenal and school stations will be considered confidential. No visitors will be allowed in the radioelectric stations of the fleet, neither persons outside the navy, even though they be accompanied by a member of the same.

Visitors must have written authorization from the Minister of Marine or the chief of staff.

Proposed wireless communication between London, Buenos Aires, and Rio de Janeiro

Direct wireless communication between London, Buenos Aires, and Rio de Janeiro is under contemplation by the Marconi Wireless Telegraph Co. This was recently announced by Signor Marconi at a special meeting of the company at which he gave an outline of the new services contemplated.

The meeting also agreed to an alteration of its articles of association, whereby the company will remain under British control, with not more than a quarter of the stock held by foreigners. Signor Marconi explained that this revision was desired by the Postmaster General.

New Santiago aerodrome

The work of constructing the new aerodrome on the land recently expropriated by the Government of Santiago del Estero is already well advanced. In the course of the present week the building of the hangars will be started, and the foundation stone is to be laid on the 19th instant.

The area of the aerodrome will be sufficient to admit of the landing of big war planes. General Vacarezza, commanding the sixth section of the army, is expected there to inspect the work.

BRAZIL

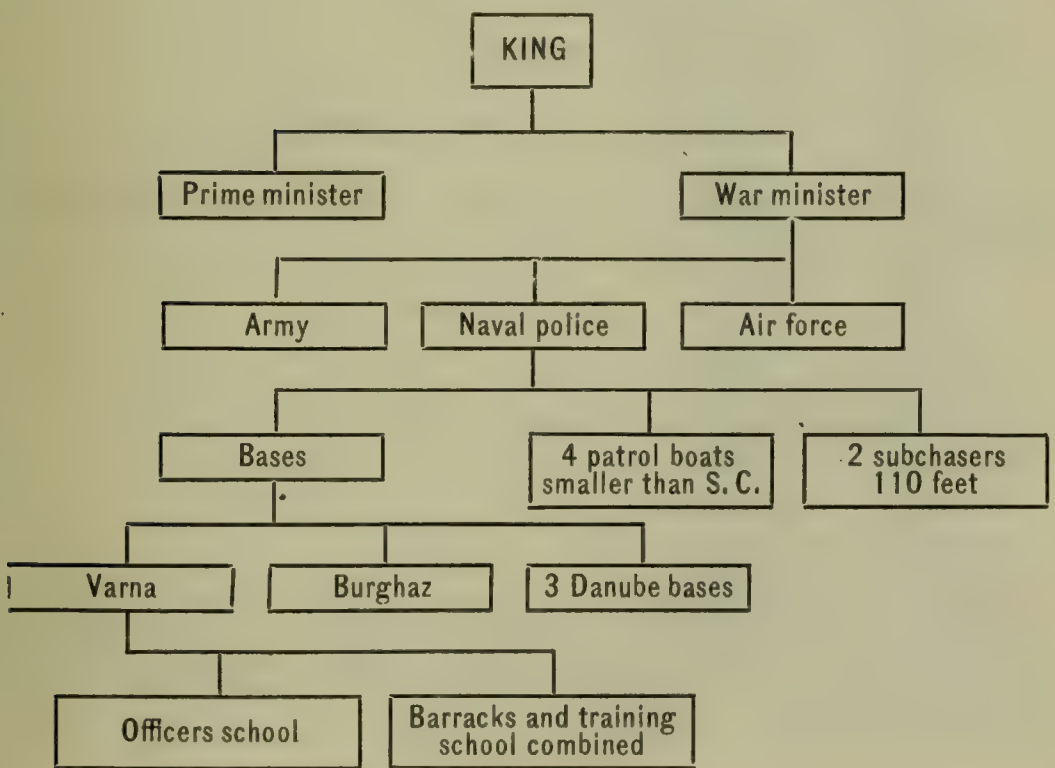
CONTRACT FOR UNITED STATES NAVAL MISSION RENEWED

The contract between the Federal Government of Brazil and the United States providing for an American naval mission to Brazil has been renewed without modification for a period of four years from the date of the expiration of the present contract on November 6, 1926.

The mission, inaugurated in 1922, has at present a personnel of 13 line officers, 1 medical officer, 1 supply officer, 1 constructor, and 18 petty officers.

BULGARIA

Organization of navy



FRANCE

LIGHT CRUISER "DUGUAY-TROUIN"

Frontispiece shows 8,000-ton light cruiser *Duguay-Trouin* (also *Lamotte-Picquet* and *Primæuguet*).

Characteristics

Laying of keel, April, 1922.
Launched, August, 1923, Brest.
Trial trips, March, 1926.
Length, 604 feet over all.
Beam, 56¼ feet.
Draft, 17½ feet.
Armor, practically nil, except for thin gun shields and splinter proof C. T.
Battery, eight 6.1 inch, 45 caliber (direct control). Four 2.8-inch antiaircraft. Two machine guns, 13-mm. Hotchkiss. Torpedo tubes (21.7-inch), 12 in triple mountings; two scouting seaplanes.
Machinery, four Parson geared turbines. Designed S. H. P. 100,000=34.5 knots; four screws. Oil, 500 tons normal, 1,000 tons maximum.
Radius, 880 miles at 34 knots; 1,290 at 30; 3,000 at 20; 4,500 at 15.
Complement, 27 officers, 551 men.
Lamotte-Picquet launched March, 1924, at St. Nazaire.
Primauguet launched May, 1924, at Brest.

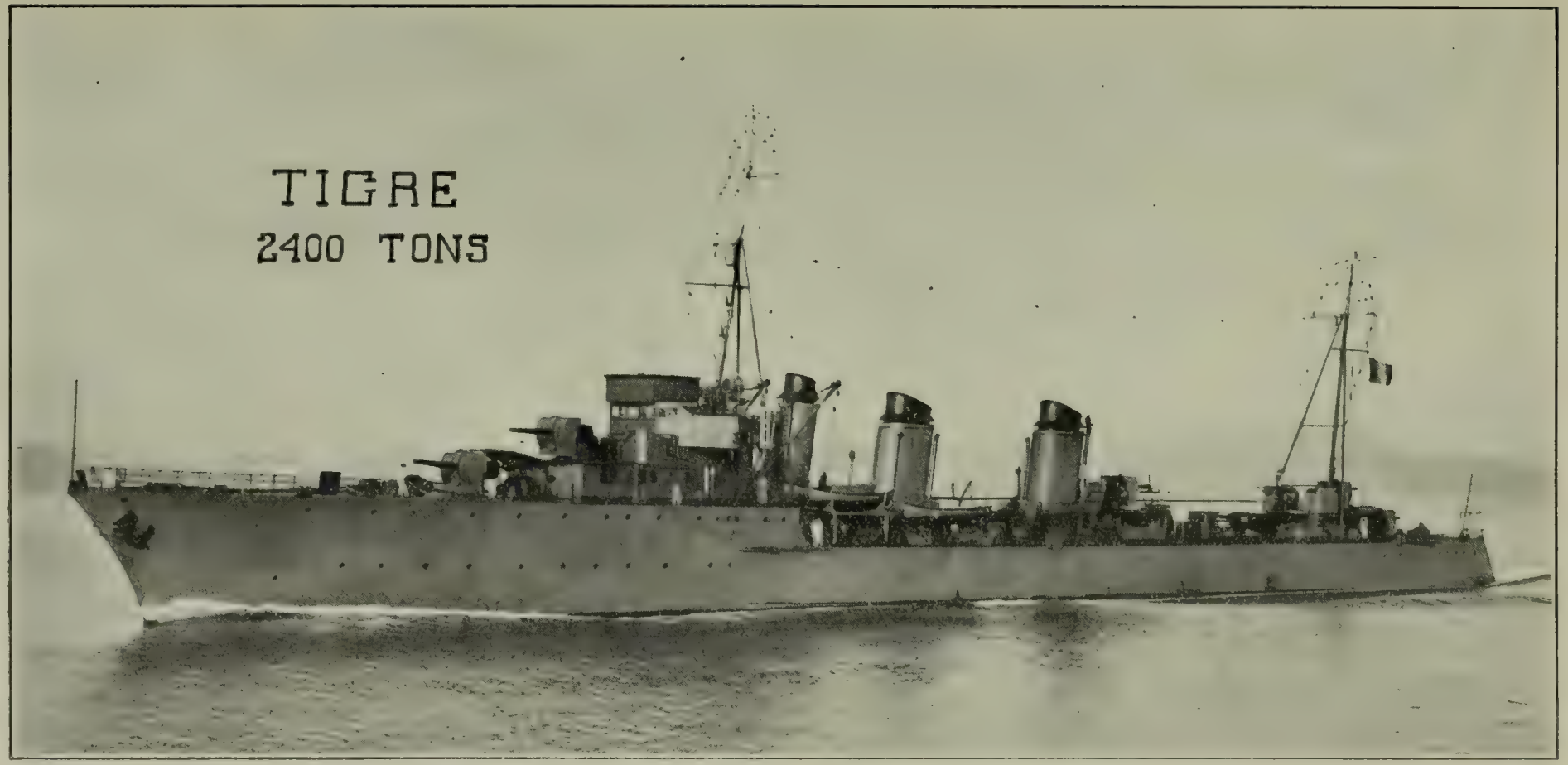
FRANCE

DESTROYER LEADER "TIGRE"

Photograph shows 2,400-ton destroyer leader *Tigre* (also *Jaguar*, *Panthere*, *Léopard*, *Lynx*, *Chacal*).

Characteristics

Laying of keel, September, 1923.
Launched, August, 1924, Nantes.
Trial trips, November, 1925.
Length, 416 feet over all.
Beam, 36 feet.
Draft, 14¾ feet.
Battery, five 5.1 inch, 45 caliber, gun shields. Two 2.9 antiaircraft. Six 13-mm. Hotchkiss machine guns. Two triple 22-inch torpedo tubes.


TIGRE
2400 TONS

DAUPHIN
1100 TONS

Machinery, S. H. P. 50,000=35.5 knots; 2 Rateau turbines; 5 Du Temple boilers; oil, 500 tons.

Radius, 3,500 miles at 15 knots; 2,500 miles at 18 knots; 900 miles at full speed.

Complement, 8 officers, 200 men.

Jaguar launched November, 1923, at Lorient.

Panthere launched October, 1924, at Lorient.

Léopard launched September, 1924, at St. Nazaire.

Lynx launched November, 1924, at St. Nazaire.

Chacal launched August, 1924, at St. Nazaire.

FRANCE

SUBMARINE "DAUPHIN"

Photograph shows 1,150-ton submarine *Dauphin* (also *Requin*, *Morse*, *Narval*, *Souffleur*, *Espodon*, *Marsouin*, and *Phoque*.)

Characteristics

Laying of keel, January, 1923.

Launched, April, 1925.

Trial trip, March, 1926.

Length, 256½ feet.

Beam, 21½ feet.

Draft, 15 feet.

Battery, one 3.9-inch. Eight 21.7-inch torpedo tubes (4 bow and 4 stern; 16 torpedoes carried).

Machinery, two Diesel motors, type Sulzer, 3,000 horsepower=16 knots. Electric drive, 248 "D" type batteries, 1,800 horsepower= 10 knots.

Radius, 7,000 miles at 9 knots on surface; 105 miles at 5 knots submerged. Endurance, equal to 30 days' cruising.

Complement, 4 officers; 50 men.

Requin launched at Cherbourg, July, 1924.

Morse launched at Cherbourg, 1925.

Narval launched at Cherbourg, September, 1924.

Souffleur launched at Cherbourg, September, 1924.

Espodon launched at Toulon, May, 1926.

Marsouin launched at Brest, 1925.

Phoque launched at Brest, March, 1926.

FRANCE

NAVAL BUILDING PROGRAM

The bill which was passed by the Chamber of Deputies March 7 authorizes the Minister of Marine to let contracts for the construction of the following units between July 1, 1926, and July 1, 1927:

One light cruiser, 10,000 tons (11,580 tons metric).
One special schoolship, 5,000 tons (auxiliary cruiser).
Three destroyer leaders, 3,100 tons.
Four torpedo boats, 1,500 tons.
One cruising submarine, 3,000 tons.
Five submarines, first class, 1,550 tons.
One submarine mine layer, 750 tons.
One submarine tender, 6,000 tons.
Two oil tankers, 7,000 tons.

The following annual expenditures, also approved by the chamber, will be necessary to execute the above program:

	Francs
1926	11,210,000
1927	154,050,000
1928	310,750,000
1929	310,850,000
1930	172,040,000
Total	958,900,000

Price per ton at prevailing market prices

	Francs
Light cruiser	13,200
Destroyer leaders	16,000
Torpedo boats	17,800
Cruising submarine	21,450
Submarine, first class	20,800
Submarine mine layer	25,500
Submarine tender	13,350
Oil tankers	3,200

The price of each unit, according to present contract prices, is therefore as follows:

Type of ship	Ship with armament, ordnance, etc.	Stocks, spare parts, etc.	Total cost
	Francs	*Francs*	*Francs*
Light cruiser, 10,000 tons	153,000,000	21,500,000	174,500,000
Destroyer leaders, 3,000 tons	49,000,000	7,000,000	56,000,000
Torpedo boats, 1,500 tons	26,500,000	3,500,000	30,000,000
Cruising submarine, 3,000 tons	64,500,000	9,000,000	73,500,000
Submarine, first class, 1,550 tons	32,500,000	4,500,000	37,000,000
Submarine mine layer, 750 tons	19,000,000	6,000,000	25,000,000
Submarine tender, 6,000 tons	80,000,000	6,000,000	86,000,000
Oil tanker, 7,000 tons	22,500,000	1,500,000	24,000,000

FRANCE

UNVEILING OF MONUMENT AT ST. NAZAIRE

The unveiling of the monument at St. Nazaire, June 26, 1926, to commemorate the landing of the first American troops in France, took place with splendor worthy of the occasion.

The American ambassador, representing the United States, accompanied by the naval and military attachés, attended the ceremony.

Admiral Gleaves, United States Navy (retired), on board the U. S. S. *Memphis*, represented the United States Navy, and Brigadier General Rochenbach represented the United States Army. General Pershing, who is on a temporary visit to France, was present in company with General Gouraud, governor general of Paris.

Ambassador Myron T. Herrick made the presentation speech and presented the monument to Mr. Leygues, Minister of Marine, who accepted it in the name of France.

The following-named ships were present at the ceremony:

United States ships

Memphis (flagship).	Charles Ausburn.
Lardner.	Case.
Preston.	Lamson.
Isherwood.	Osborne.
Sharkey.	

French ships

Voltaire (flagship), Rear Admiral Chauvin

TORPEDO BOATS

Rageot de la Touche.	Lestin.
Vesco.	Delage.
Mazare.	

SUBMARINES

Dupuy de Lome.	Gustave Zede.
Bellone.	Hermione.
Daphne.	Carissan.
Jean Corre.	Trinite Schillemans.

OIL TANKER

Nievre

GERMANY

WEATHER CHART TRANSMISSION BY RADIO

[From the German press]

Experiments of picture transmission by wireless by the Dieckmann system have recently been organized by the "Debeg", the German

society for wireless telegraphy, and the Hamburg Observatory. The inventor of this system, Doctor Dieckmann, professor at the Technical High School in Munich, and his assistant, engineer Hell, were offered accommodation on board the *Westphalia* by the Hamburg-America Line for a voyage to New York for the purpose of pursuing these experiments. A Dieckmann picture transmitter was installed in the Hamburg Observatory, similar to that used for picture transmission by the Munich wireless sender. The telegraph instruction office contributed telegraphic connections from the Hamburg Observatory to the coast wireless station of Norddeich (a distance of 200 kilometers) through which the Norddeich 5 kw. transmitter was controlled from a distance. Every day the meteorological section of the observatory registered the reported wind strength and the course of the isobars, which it deduced from the daily wireless ship reports, on an oceanic chart designed to be received by the *Westphalia*. The receiving apparatus on board the *Westphalia* consisted of a normal ship receiver supplemented by a rectifier and a special picture receiver. The picture receiver does not work by photography but plots the transmitted oceanic chart directly upon a previously prepared map.

The experiments proved unexpectedly successful and the officers of the *Westphalia* received the newest weather charts every day. The highest record was furnished by the weather chart of April 23, which was received quite complete 10 days after the *Westphalia's* departure from Hamburg at a distance of 4,500 kilometers from the transmitter. On certain days stripes of varying lengths appeared upon the pictures, owing to atmospheric perturbations, but they did not prevent the charts from being clearly readable. The pictures were sometimes disturbed by certain transmitting stations such as the Spanish coast station of Cadiz; but whenever ships with wireless transmitters came near to the *Westphalia*, they altered their waves during the time of the picture transmission, thereby obviating the possibility of disturbances.

GERMANY

FUEL AND INFLATION GAS FOR DIRIGIBLES

[From the German press]

A new method of using gas as a fuel for dirigibles has been proposed by Curt Peters and Peter Schlumbohm.

In the reports regarding the flight of the *Norge* from Italy to Spitzbergen, it was stated that the landing of the airship was always effected with great difficulty. This experience therefore caused Amundsen to abandon the idea of landing at the pole. These land-

ing difficulties were not the question of personal ability on Amundsen's part but were due to the imperfection of the airship. The benzine consumption during the flight makes the airship continually lighter (tests to obtain ballast water from the exhaust gases are still in their initial stages). The buoyancy must be greatly reduced by blowing off gas in order to be able to land at all. This process is technically very difficult. As the carrying capacity of the *Norge* had to be used completely for the great quantities of benzine, there was very little room left for ballast. There was also the danger of the ship not being able to rise again if she once landed at the pole, and a sacrifice of gasoline would have jeopardized the return journey. Amundsen's prospects would have been more favorable by using a larger airship, but then the general skepticism would have been justified owing to the above-mentioned objective deficiencies of an airship operating with benzine motors. In our opinion these deficiencies can be obviated by using gas motors and gas-generating fuels which carry themselves. To cite a concrete example, in a 70,000 cbm. ship such as the *ZR–III* (*Los Angeles*), 30,000 cbm. hydrogen or helium which serve only to carry 30 tons of benzine (as in the American flight) could be replaced by 30,000 cbm. motor-driving gas, such, for instance, as acetelyn, illuminating gas, aethen, etc. The use of this fuel would not lighten the ship any during flight. The process can be varied by using two gases for operating the motors, one lighter and the other heavier than air. The simultaneous consumption of the gases keeps the ship at the same altitude; using the lighter gas would make it drop; the heavier would make it rise. The energy value of this 30,000 cbm. heating gas is approximately twice as much as that of 30 tons of benzine. This remaining 40,000 cbm. of inflation gas would keep the buoyancy continuously the same. The cruising radius would then be dependent only on the quantity of motor gas. A portion of this can be generated during the flight by chemical means. For example, the water condensed by the combustion of acetelyn could be used for the regeneration of acetelyn by the use of calcium carbide. The modern type of airship can be improved by deriving energy during the flight by exploitation of the exothermic reaction between balloon gas and atmosphere and the attainment of a constant buoyancy. From a physico-chemical standpoint the use of benzine motors in airships is illogical.

A few days ago, Mr. Peter Schlumbohm came to see me and told me that he and the Zeppelin Co. were having a controversy with regard to this new idea. He said that he and Mr. Curt Peters had put in an application for patents for an idea covering the use of two gases, one lighter than air and the other heavier than air, as described

in the foregoing article. He said that Doctor Eckener claims that one of his chemists had hit upon the same idea at the same time and that they had also applied for a patent for the use of the gas having the same specific weight as air. The idea is therefore different from that of Messrs. Peters and Schlumbohm.

Lately some articles have appeared in the newspapers to the effect that a new dirigible is to be built by the Zeppelin Co. at Friedrichshafen in which the new gas fuel is to be employed. Two of these articles are as follows:

[Chicago Tribune. Paris edition]

A Zeppelin twice the size of the *Los Angeles* will shortly be built at Friedrichshafen it was announced here yesterday by Doctor Eckener, commander of the *Los Angeles* on her trip in October, 1924, to the United States. At the same time he revealed that an entirely new gas fuel has been discovered by Doctor Lempertz, chemist of the Zeppelin works. The new gas fuel, besides being superior to benzine, has the same specific weight as air and also considerably lessens danger from explosions.

It is believed that cruising radius of airships will be increased as well as the speed by use of the new gas, which will be carried in special gas cells. As soon as experiments with the new gas have come to a conclusion construction of the new Zeppelin will be begun. It is hoped that the new airship will be finished by August of next year.

[New York Herald. Paris edition]

The building of the immense Zeppelin at Friedrichshafen is renewing the discussion of the possibilities of replacing gasoline by nonexplosive gas as fuel. This idea of gas fuel was first considered here scientifically by two Berlin students, Peters and Schlumbohm.

The first investigation of these young men was generally known to the public. Their earlier scheme was to fill an airship with helium and so control it that the craft would be made to rise and descend without losing either ballast or gas. The helium would be electrically heated and cooled.

The newest idea of Peters and Schlumbohm is to use not one gas like ethane with specific gravity equal to air like the new Zeppelin, but two gases, one lighter and one heavier than air.

When the airship is to ascend, then the heavier gas must be consumed by engines; when it descends, the lighter is consumed. When the carrying gas is helium, this method, combined with electrical heating and cooling, would altogether eliminate waste of the precious helium. It would also greatly simplify the whole problem of navigation. Only a small amount of ballast would be required for emergencies. The inventors also suggest that gas fuel be carried in chambers inside the helium. Fuel can explode only when in contact with air, and in case of an attack with incandescent projectiles the surrounding helium would act as a fire extinguisher. Thus the fire risk from all sources would be almost completely eliminated.

GREAT BRITAIN

NAVAL NOTES

Use of high-pressure steam in modern British construction

Referring to previous information on the subject of the use of high-pressure steam in modern British construction, it has been learned from an authority that is usually found to be reliable that Yarrows (Ltd.), in addition to the experimental installation using 550 pounds pressure in the *King George V*, are also probably to use 350 pounds pressure in a vessel being built for the Canadian Pacific Steamships (Ltd.).

It is also strongly rumored that Yarrows (Ltd.) are preparing designs for destroyer boilers to use 400 pounds pressure, which designs are to be furnished to the Japanese Government. The reports not only that Japan seems interested in high-pressure installations, but also that they are turning to British designs in this matter, are interesting, if true.

It is also reported that Yarrows (Ltd.) are either building boilers or preparing designs for boilers for the Dutch Navy, for destroyer use, in which 300 pounds pressure is to be employed.

Machinenfabrik Augsburg-Nuremburg and Vickers (Ltd.) agreement

Vickers (Ltd.) have just signed an agreement with the Machinenfabrik Augsburg-Nuremberg by which Vickers acquire the right to build single and double acting two-stroke oil engines of M. A. N. design for the British Empire and Colonies. The Vickers four-stroke type will continue to be built for medium powered ships, and the light weight high speed Vickers engine for submarines.

[From the British press]

Modernization of the "Renown"

The return to service of the battle-cruiser *Renown*, which has been paid off under dock-yard control at Portsmouth for two years, is foreshadowed by the selection of Capt. N. A. Sulivan, now director of the torpedo division, to command her. Capt. Cyril St. C. Cameron, C. B. E., late captain (D) of the Portsmouth Reserve Flotilla, is relieving Captain Sulivan at the Admiralty on July 20, and the latter will proceed to join the *Renown* forthwith.

The repairs to the ship are due to be completed next month. It was in the *Renown* that the Prince of Wales made his tours to Canada in 1919, Australia in 1920, and India and Japan in 1921–22, but, owing to her being in dockyard hands, the *Repulse*, her sister ship, was used for the tour to South Africa and South America last year. The total spent upon the reconstruction of the *Renown* will probably be not far short of a million sterling, the estimated sum when the last navy estimates were prepared being £979,927. Incidentally, her displacement has been increased from the 26,500 tons, for which she was originally designed, to 32,500 tons with the antisubmarine bulges.

Full crew for "Repulse"

Manned by a special two-fifths complement since January 26 last, while undergoing repairs at Portsmouth, the battle cruiser *Repulse*, of which Capt. E. R. G. R. Evans, C. B., D. S. O., assumed command a few days ago, completed June 25 to full crew again.

Recent fleet activities

The whole fleet arrived in Torbay July 8, and by July 11 there were upwards of 50 of His Majesty's ships at anchor off Torquay.

The Atlantic Fleet, under the command of Admiral Sir Henry F. Oliver, K.C.B., has in the past few weeks been carrying out firing and other exercises in Scottish waters. On the completion of these exercises the fleet target ship and her consorts have returned to Portsmouth, and the ships of the fleet have been dispersed around the coast preparatory to a concentration taking place in the channel at the end of this week.

The fleet flagship *Revenge* has been at Portree, the battleships *Marlborough* and *Benbow* at Bangor, *Ramillies* at Lamlash, *Emperor of India* at Lewe Deep, and the battle cruiser *Hood* after leaving Rosyth has made a call at Shoeburyness. The second cruiser squadron, consisting of *Curacoa*, *Caledon*, *Cleopatra*, and *Comus*, has made a short stay at Eastbourne before paying a visit to the Channel Islands. The fifth and sixth destroyer flotillas have been to ports in Scotland and northern Ireland and are now collecting at Falmouth.

Opportunity is being taken of the concentration of the fleet to carry out submarine exercises, in which the first submarine flotilla and the local defense flotillas from Portland and Plymouth will

take part. Some of the smaller ships have recently taken part in the combined naval, military, and air force exercises in the south of Devon, which have just been concluded.

After the Torquay visit the fleet will be dispersed to home ports to give summer leave, which is due to start on July 19 and to be completed by September 1.

Visits of Mediterranean Fleet

During July the Mediterranean Fleet visited all ports of any consequence on both sides of the Adriatic.

New Zealand naval activities, June, 1926

The mine-sweeping trawler *Wakakura* has now been fitted out at Sheerness for the New Zealand naval force. The fleet tug *Toia*, formerly one of the "Saint" class in the Royal Navy, has also been handed over to the Dominion Government. Thus the foundations are being laid in a very modest way of what will undoubtedly prove to be an efficient local force and an asset of the Empire. The New Zealanders now not only maintain two first-class cruisers, the *Dunedin* and *Diomede*, but make good use of them. Both are now cruising among the Pacific islands, being at Suva until June 14, when they proceeded to Lautoka. The seniority list of the New Zealand Navy now includes well over 50 commissioned and warrant officers, and in addition a good start has been made with New Zealand divisions of the Royal Naval Reserve and Royal Naval Volunteer Reserve. The Dominion is evidently treading the way mapped out with such persistency by that farseeing patriot, the late Mr. W. F. Massey.

New submarine's trials

Submarine *L-26* is commissioned for trials about July 20 at Portsmouth. This is the last of the submarines of war program, laid down by Messrs. Vickers at Barrow in January, 1918, and towed after her launch to Devonport, where her machinery has been installed. She is of 800 tons (1,080 submerged), with engines of 2,400 horsepower on the surface and motors of 1,600 horsepower under water, giving corresponding speeds of 17½ and 10½ knots. Her armament includes one 4-inch gun and four torpedo tubes.

GREAT BRITAIN

MISCELLANEOUS NOTES

South Pole expedition

[From consular reports]

The *William Scoresby*, which has been undergoing an overhaul at Hull for some weeks, sailed on June 25 for Cape Town via Brixham. At Cape Town, it is understood that the vessel will join the *Discovery* for a South Pole expedition, although the immediate object is reported to be the studying of the habits and breeding of whales. The cost will be borne by the Government of the Falkland Islands, under whose flag the ship will sail.

The vessel carries two scientists, and scientific appliances of every description have been installed. The crew consists of 33 persons.

Wireless in the Pacific islands

A number of the more remote islands under New Zealand control have communication with the outside world by wireless, and the system will be extended to some of the more distant and smaller groups. One of the greatest obstacles in the past has been the problem of securing staffs of operators. This has been overcome by the advance of education in the islands, and several of the stations in recent years have been staffed and operated successfully by native youths, trained for the purpose—some at the wireless schools of the Dominion, but latterly at the main radio stations at Rarotonga and Apia. These lads show great aptitude for the work, and are giving very satisfactory service at various points in the Cook Group.

It is now intended to connect the recently taken over Tokelau (or Union) Group with wireless to enable the islands of Atafu, Nukunono, and Fakaofo to connect with Apia. Recent tests have proved very satisfactory over the 300 miles separating the islands from Samoa. Three boys from the Union Group are at present undergoing training to take charge of these stations, and it is hoped to have them installed before the end of the year.

It is also proposed later to establish wireless communication with Penrhyn, the most northerly point of the Dominion's territories, which is situated only nine degrees south of the Equator.

New flying boat

Driven by three Napier engines of a nominal 650 horsepower, one of the most powerful flying boats constructed in this country since

the war, was secretly and successfully tested at Brough recently from the Humber. At a great cost it has been designed and built in two years by Major Rennie for the naval air arm of Great Britain, and it will now be followed by an all-metal boat of the same design, which is at present on the stocks. Having a useful range of 1,100 miles, it carries bombs slung beneath the bottom wings, is capable of alighting in any sea and proceeding into port under its own power, and can be anchored at a berth like a ship. Mounted above the long tapering hull, the immense wings of 100 feet span support the three great engines between them—one in the center above the hull and one on each side. The total weight in the air is 12 tons, 3 tons more than the colossal long-distance bomber, *The Cubaroo*, tested some time ago at Brough.

Crew of five.—Despite its huge size, a crew of five only is carried—a gunner in the extreme nose, two pilots, and two engineers, all completely housed and covered in the hull like stokers in a ship. Also one engine can maintain the craft in flight in the event of the others failing, and it need not necessarily be the center engine in order to keep on a straight course, for the tendency of the boat to circle when another engine is running is obviated by the rudder being kept hard over.

The hull tapers to the tail in beautiful lines, far finer than a ship's, which has not such a fine medium to cleave as the air. It is built up of layers upon layers of fine spruce ribs in a circular section and covered with layers of thin plywood, then a skin, which finally is doped and painted, rendering it waterproof. The flying boat is the natural advance on the seaplane, being more seaworthy, powerful, and endurable.

Pioneer expert.—This is only the second flying boat built at Brough, the first being the famous small racer, *The Pellet*, which so unfortunately crashed at the Isle of Wight on the eve of the Schneider cup race three years ago, for which it was a strong favorite. *The Iris*, as the new boat is called, is the product of a a pioneer expert, for Major Rennie helped Commander Port to design the *Felixstowe Fury*, the largest flying boat ever built, which crashed in Felixstowe Harbor during the war on the eve of a long-distance test flight to Plymouth, after successfully flying the harbor on the previous day. *The Iris* is now moored on the water at Brough, waiting its transfer to the naval air arm for further severe service tests, and then active service.

Supermarine patrol plane "Southampton"

[Source reliable]

The characteristic and performances of the *Southampton* are as follows:

The supermarine *Southampton* has taken the place, as a service-type patrol plane (two-engine boat), of the old *F–5*. There is one complete flight of *Southampton's*. The only data available on this type service plane is as follows:

Pusher or tractor	Tractor.
Crew	Five.
Engine	Two Napier lions.
Normal British horsepower and r. p. m. at ground level	2×470 at 2,000 r. p. m.
Performance data	Not available.
Fuel capacity	477 United States gallons.
Weight, gross	14,300 pounds.
Remarks	Bomb racks permanently fitted on each wing.

World's largest cable ship

[From the British press]

Despite all the tremendous strides in long-distance wireless communication, cable makers and cable companies, as well as the Imperial Government, would appear still to have faith in the older method by the fact that the latest and largest cableship, the *Dominia*, to-day made her first trial trip down the Thames.

Built to the order of the Telegraph Construction & Maintenance Co., of Greenwich, the new vessel is of 9,000 gross tonnage, and has been constructed primarily to put down the second Pacific cable between Bamfield, British Columbia, and Fenning Island, incidentally the longest stretch of submarine cable in the world—3,458 miles. Her tests proving satisfactory, she is expected next month to sail on her long and laborious task.

Red menace to India

Confirmation of the seriousness of the Bolshevist menace to India is provided by Colonel Saunders, director of military intelligence in India, lecturing to Europeans in Calcutta. After quoting Zinovieff as saying that "the Achilles heel of the British Empire is India, and we, therefore, must make every effort to develop all possible lines of advance on India," Colonel Saunders described the extensive Bolshevist propaganda in Arabia, Iraq, Turkey, and Persia, and the

disappearance of Bokhara and Khiva, which have been replaced by Soviet republics.

"In Afghanistan," said Colonel Saunders, "the Soviet is most active in preparing lines of advance and in endeavoring to obtain paramount influence. The Russians are giving large subsidies, mainly in arms and munitions, and their engineers are busily building roads and railways. An Afghan air force is being developed, with Russian pilots and mechanics, with its main aerodrome at Kabul, and landing grounds have been made at Kandahar and Jellalabad, and from their present aerodromes the Russians can easily bomb Peshawar, Kohat, and Rawal Pindi, and even down to Lahore. This penetration is a serious menace to the peace of India. Farther east, in Chinese Turkestan, the same policy is at work, which, if successful, means that India will have in the mountainous area contiguous to its frontier 800 miles of Bolsheviks."

Via China.—The speaker saw in the Red activities in China yet another threat to India through Tibet and Burma, and concluded: "Whereas other nations are economizing on miltiary expenditure the Soviet is increasing by 50 per cent. The Soviet menace to India is a very real one, and Bolshevism is the real enemy of all civilized nations. The British Empire has to bear the brunt and main attack, which, as announced by the Soviet leaders themselves, is being directed at India."

Colonel Saunders's revelations have created a considerable stir, and this confirmation of the many recent grave rumors is prompting curiosity concerning the resources available to counter the threat.

Lord Rawlinson and General Birdwood have both hinted in speeches that the military strength is at danger point, while less highly placed soldiers do not disguise their amazement at the evidence of an alarming shortage of mechanical resources.

ITALY

SHIPS UNDER CONSTRUCTION

As of May 1, 1926

[Source official]

Light cruisers

Name	Shipyard	Per cent completed	Date of completion
		Per cent	
Trento	Orlando, Livorno	25	Indefinite.
Trieste	Stabilimento Tecnico, Triestino	26	Do.

SHIPS UNDER CONSTRUCTION—Continued

Destroyers

Name	Shipyard	Per cent completed	Date of completion
[illegible]	Patteson, Naples	Finished.	
[illegible]	do	99 per cent	First half 1926.
[illegible]	do	94 per cent	Indefinite.
[illegible]	do	98 per cent	First half 1926.
[illegible]	Odero Sestri, Ponente	92 per cent	Do.
[illegible]	do	77 per cent	Second half 1926.
D. Mazzini	Cant. del Quarnaro, Fiume	96 per cent	First half 1926.
[illegible]	do	86 per cent	Second half 1926.
Turbine	Odero Sestri, Ponente	45 per cent	Do.
[illegible]	do	39 per cent	Do.
Nembo	Esercc Bacini, Genova	58 per cent	Do.
Euro	do	52 per cent	Do.
Borea	Ansaldo Sestri, Ponente	57 per cent	Do.
Zefiro	do	50 per cent	Do.
Espero	do	42 per cent	Do.
Ostro	do	36 per cent	Do.

Submarines

Bafilla	Ansaldo, San Giorgio, Spezia	56 per cent	First half 1926.
E. Toti	do	45 per cent	Second half 1926.
D. Millelire	do	48 per cent	Do.
A. Scesa	do	2 per cent [1]	Indefinite.
V. Pisani	Cant. Navale Monfalcone, Trieste	23 per cent	Second half 1926.
M. Colonna	do	18 per cent	Do.
G. Bausan	do	15 per cent	Do.
Des Geneys	do	13 per cent	First half 1927.
Masaniello	Cantiere Tosi, Taranto	49 per cent	Second half 1926.
Pier Capponi	do	46 per cent	Do.
G. Da Procida	do	42 per cent	Do.
Tito Speri	do	32 per cent	First half 1927.
E. Fieramosca	do	Not laid down	Indefinite.

[1] Just started.

Mine layers

Buccari	R. Cantiere, Castellammare	65 per cent	Second half 1926.
Durazzo	do	50 per cent	First half 1927.
Pelagosa	do	80 per cent	Second half 1926.
Milazzo	Cant. Navale Triestino Monfalcone	50 per cent	Do.
Dardenelli	do	80 per cent	Do.
Ostia	do	40 per cent	Do.
Azio	Cant. Nav. Riuniti Ancona	Ready	
Legnano	do	do	
Lepanto	do	do	

Auxiliaries

G. Miraglia	Royal Arsenale, Spezia		Indefinite.
Quarnaro	Cant. Nav. Scoglio Olivi	91 per cent	June, 1926.
Christ. Colombo	R. Cantiere, Castellammare		Indefinite.
Tarvisio	do	70 per cent	Second half 1927.
Mas (subchasers)	Nost 423, 424, 425, 426, Cantiere Svan, Venice	55 per cent	Indefinite.

Comments by a member of Italian Senate committee re above construction

We will now give a summary list of ships under construction:

Light cruisers, Trento type	2
Destroyers	15
Submarines	13
Mine layers	3
Mine sweepers and ships for colonial use	6
Training ships	1
Oil tankers	1
Aircraft tenders	1
Submarine chasers (Mas)	4
Total	46

The situation is therefore almost the same as last year; few ships under construction have entered service, and few have been laid down. As regards the *Trento* cruisers, a delay in respect of the date of the contract is expected; these ships are of a new type, very complex, and difficult to build, as they are the result of a compromise between various requirements rendered necessary by the limitations of the Washington treaty, and must therefore be carefully and elaborately studied. I am informed that the Ministry of Marine is making all possible efforts to reduce the probable delay.

Only the *Sella* of the four destroyers that were under construction at the Pattison yards last year has entered service lately; the other three of the same type will be soon finished, however, and so will the other more up-to-date types under construction at the Odero and Carnaro yards.

One submarine, ordered at the Tosi yard at Taranto, has been added to those in construction last year. I will forego speaking of the smaller units and auxiliary ships. But I am informed that studies for new construction are vigorously prosecuted, and I think it will be best to preserve on the subject the same reserve which is kept by the ministry. I will only say that capital ships, apart from the theoretical discussion on their present value, are out of the question for financial reasons, and therefore our program of new construction will concentrate on light cruisers, large destroyers, and submarines, ships that will enable us to keep up, in case of war, an active defense, extenuating for the enemy, as we will be able to keep him everywhere under constant vigilance, and eventually place us in the position of defeating his plans, blocking the way to his convoys, and possibly to strike, under favorable conditions, a decisive blow.

Under these conditions the question may arise whether our largest surface ships ought to reach the maximum displacement allowed for standard cruisers, or keep to smaller tonnage in order to increase the number of units, while having always hulls large enough to go to sea under all kinds of weather. Perhaps the solution may be to complete the number of light cruisers of the *Trento* type and to build at the same time a large number of smaller cruisers.

Submarines occupy an important place in modern warfare. They may even, in part, cancel the differences in naval power between nations of different economical capacities. We can not therefore give them up. We must watch the gates of this great lake, the Mediterranean, and watch the naval bases which may harbor our enemies' forces; we must cripple these forces before they reach points where they may hurt us. It is therefore certain that submarines will have in our future fleet the important position which they deserve.

We can not end this report without answering those that accuse the Italian Navy of wide hegemonic dreams, notwithstanding the evident limitations of our budget, which allows us barely enough new construction to fill up gaps and to keep us in that position which is required by the extent of our coasts, and our geographical, historical, political, and colonial conditions.

NOTE.—The following minor errors are noted in the report of the Senate committee as given above:

(1) There are 9 mine layers under construction instead of 3 mine layers and 6 sweepers.

(2) The repair ship *Quarnaro*, under construction at the Cantiere Navale Scoglio Ulivi, at Pola, and which is 95 per cent completed is omitted.

The auxiliary ships *Barbana* and *Fianona* have been stricken from the list.

Italian submarines for Rumania

One of the clauses of the agreement by which Italy loans 200,000,000 lire to Rumania provides for the construction of a number of Italian submarines to be sold to Rumania for a total sum of 175,000,000 lire. Rumania will pay the sum in five yearly installments, each of 35,000,000 lire.

Launching of destroyer "G. Nicotera"

[From a consular report]

The Italian destroyer *G. Nicotera* was launched successfully and without incident at the Cantieri Napoletani C. and T. T. Pattison at Granili, Naples, on the morning of June 24, 1926. This vessel is the last of a class of four to be constructed by the Pattison yard under contract by the Italian Government. Its specifications for construction are the same and its armament and equipment will be similar to those of the other three vessels of its class.

The launching was effected in the presence of the local naval authorities, with the customary religious ceremony, and was very simple. It is reported that work on the vessel was much further advanced prior to its leaving the ways than in the case of the other three destroyers. The officers and crew were at their stations. The ship was towed to the Naples Navy Yard, where it will outfit.

The three sister destroyers are the *Quintino Sella*, the *Francesco Crispi*, and the *Ricasoli.*

The *Quintino Sella* was launched in April, 1925. It outfitted at Naples and held its engineering trials here, in the course of which a speed of 37 knots was attained. After a short period at Spezia, for the installation of certain ordnance equipment, the vessel proceeded on a "shake-down" cruise to the eastern Mediterranean, on which duty it is now engaged.

The *Francesco Crispi* was launched in September, 1925. It has finished outfitting at Naples and is now completing its engineering trials. A maximum horsepower of 40,000 was developed, driving the vessel at a speed of 39 knots.

The *Ricasoli* was launched in January, 1925, and is now outfitting at the Naples Navy Yard.

ITALY

MISCELLANEOUS NOTES

Best airplane of each class

The type of Italian airplane (now in service or in production) which is considered to be the best of its class, is as follows:

Class	Seaplane	Land plane
(*a*) Pursuit	M–7 ter	C R–1.
(*b*) Observation	S–16 ter	A–300/4.
(*c*) Spotting	S–16 ter	A–300/4.
(*d*) Bombardment (?)		BR–1 (day).
(*e*) Torpedo plane (light bombardment)	S–16 ter	Ca–73 (night).
(*f*) Scouting	S–16 ter	
(*g*) Large boat	M–24 bis—S–55	or Cant–6.

NOTE.—The Italians have not adopted for service, or constructed in quantity, any type of "large boat," "torpedo plane," or "bombardment (seaplane)." Experiments and trials are still being conducted on the *M–24* bis, *S–55*, and *Cant–6* types (with various modifications to the original samples of these types) with a view to adopting a service type of large seaplane to fulfill the requirements of the three classes mentioned above. Negotiations have been conducted for one experimental squadron each of the *M–24* bis and the *S–55* types, but it is understood that the construction has been held up or the negotiations canceled.

An order has been placed for 50 *Ca–73* machines (in addition to 9 *Ca–72's* for night bombardment. Detailed data as to the performance of this machine are not known, as the official tests have not been completed.

Remaining parts of N–3 sent to Japan

All the parts of the *N–3* dirigible (sold to Japan), except the gas bag, which was destroyed by fire in the recent accident, were shipped from Ciampino by a special train of 11 trucks.

The material was embarked at Naples on the steamship *Aden Maru*, specially sent from Japan. Meanwhile a new gas bag is being made and will be shipped to Japan as soon as ready.

New periscope invention

A new type of periscope (called the oloperigrafo parodi), invented by Prof. Roberto Parodi, of the Royal Nautical Institute of Genoa, was recently seen in Genoa. Like all periscopes, the observer at the eyepiece may revolve the periscope and observe any

portion of the horizon. Also, a limited area of the sky may be observed by looking up through the periscope.

The interesting feature of Professor Parodi's apparatus is the simultaneous display (on a circular screen surrounding the observer's end of the periscope) of the entire horizon. This is accomplished by means of an all-around panoramic object glass at the outer end of the periscope, the usual series of lenses in the tube, and an all-around panoramic projection lens near the inboard end of the periscope. By this means the image of the all-around horizon is projected on a screen on the inside of a cylinder surrounding the inboard end of the periscope. The size of the cylindrical projection screen will depend upon the space available and other conditions; the larger the cylinder the larger will be the projection of the object on the horizon.

In the present experimental apparatus the projection of the panorama of the horizon is inverted. Thus ships would appear to be heading and moving in the opposite direction to their true course. However, Professor Parodi states that he has studied the problem of correcting the fault and that it is entirely practicable to obtain an upright projection.

Professor Parodi states that the image of objects in the plane of the object glass are projected without distortion. As the apparatus inspected was mounted horizontally in the laboratory, it was possible to observe only objects in the laboratory and through windows on opposite sides. To demonstrate the all-around panoramic projection a large cylindrical screen, on which there were sketches and writing, was placed in a position around the object glass. A clear image of this was projected on a cylindrical screen around the observer.

The inventor claims that the apparatus may be utilized also for obtaining photographs of the all-around horizon by placing photographic film around the projection screen.

The inventor is convinced that his apparatus has great practicable value. However, no practical tests have been made and Professor Parodi states that he is not financially able to carry out such tests. He has never been on board a submarine and has had no practical experience with periscopes. Representatives of the Italian Navy have examined Professor Parodi's invention, and the Ministry of Marine has informed him that the apparatus is extremely interesting but that the ministry can not conduct practical tests of it for lack of funds.

It has been suggested that the feature of this apparatus for projecting the all-around panorama of the horizon might be utilized to great advantage in conning towers and battle stations on board sur-

face ships as well as on submarines, provided, of course, that actual tests prove the practical efficiency of this feature.

Fascist salute in merchant marine

A recent decision of the Minister of Communications, under whose jurisdiction is the Italian mercantile marine, has enforced the Fascist salute on board all Italian merchant ships as a sign of subordination and respect to superiors.

JAPAN

FLEET ACTIVITIES

The following information concerning the activities of the Japanese naval forces between December 16, 1925, and March 31, 1926, is believed to be of interest.

Notes for First Fleet

In general during the period December 16, 1925, to about January 26, 1926, the ships of the first fleet were at their home ports for liberty and leave, no movements taking place except as follows (port fuel consumption):

Third division left Kure January 21 for Hiroshima Bay, returning to Kure January 23 (fueling at Tokuyama).

Twenty-seventh destroyer division left Tsingtau for Sasebo on December 23, arriving there December 28 (delay due probably to engineering casualties).

Jingei left Yokosuka on January 24 for Kure (straight run to Kure. Purpose, to be at Kure prior to arrival of submarine division 26 from Sasebo).

Submarine division 26 left Sasebo on January 25 for Kure, arriving there January 27 (straight division run).

NOTE.—All other ships of First Fleet at home ports, port fuel consumption.

During the period January (25–28) to end of quarter all ships of First Fleet engaged in the first training period. Training consisted of gunnery and engineering exercises, fleet and detachment cruising, and tactical exercises.

From January 25 to 28 all ships sailed from respective ports for off Mitajiri via Ariake-wan (straight run fuel consumptions), arriving there by February 1.

From February 1 to March 2 all ships engaged in gunnery and engineering exercises (corresponding fuel consumption), except

that *Ro 61* arrived at Kure February 26 and remained there until March 11 (probably machinery breakdown).

March 3 all ships assembled at Kure Navy Yard.

March 3 to 8 all ships at Kure. Preparation for cruise (port fuel consumption).

March 8 all ships left Kure Navy Yard for off Miyajima except *Ro-61*.

From March 8 to 11 all ships at anchor (port fuel consumption).

March 11 First Fleet split up. First battleship division less *Yamashiro* plus *Hosho* and first mine sweeper division sailed for Beppu, arriving there March 12. (Tactical exercises en route.) First destroyer squadron sailed for Saiki Bay, arriving there March 12 (tactical exercises en route). Third cruiser division proceeded to Edauchi, arriving there the same day. First submarine squadron remained at anchor.

On March 13 first battleship division less *Yamashiro* plus *Hosho* and first mine sweeper division sailed from Beppu for Uwajima (southwest Shikoku), arriving there March 15. (Tactical exercises en route.) Above ships at Uwajima until March 17 (port fuel consumption). *Yamashiro* rejoined on March 15 from Kure. Above ships sailed for Kagoshima March 17, arriving there March 19 (tactical exercises en route).

First destroyer squadron at Saiki Bay from March 12 to 17 (port fuel consumption). March 17 sailed for Kagoshima, arriving there March 19 (tactical exercises en route).

On March 12 third cruiser division plus first submarine squadron sailed from Agenosho for Beppu, arriving there March 13 (tactical exercises en route). At Agenosho from March 13 to 15 (port fuel consumption). On March 15 sailed for Beppu, arriving there same day (straight run). March 17 sailed from Beppu for Kagoshima, arriving there March 19 (tactical exercises en route).

All ships of First Fleet at Kagoshima from March 19 to 21 (port fuel consumption). On March 21 First Fleet split up into two sections, the first destroyer squadron sailing for Sasebo and the first battleship division plus third cruiser division plus first submarine squadron plus *Hosho* and first mine sweeper division sailing for Amamioshima.

First fleet, less first destroyer squadron, arrived Amamioshima March 23 (tactical exercises en route). At anchor Amamioshima March 23–25 (port fuel consumption). Sailed for Nakagusuku Bay (Loochoo's) on March 25, arriving there March 27 (tactical exercises en route). At anchor March 27–30 (port fuel consumption). Sailed for Amoy March 30.

First destroyer squadron arrived Sasebo March 22 (straight run). At anchor Sasebo March 22–26 (port fuel consumption). Sailed

March 26 for Shanghai, arriving there March 27 (straight run). At anchor Shanghai March 27–31.

Notes for Second Fleet

All ships of Second Fleet at home ports for leave and liberty period from December 16 to January 25–29, except for speed trials and engineering runs of destroyers *Nos. 7*, *9*, *11*, and *13*, as shown on Second Fleet movement sheet.

From January 25 to January 29 all units of Second Fleet proceeded from respective home ports for Ariakewan, with exception as shown on Second Fleet movement sheet. (The second destroyer squadron, less destroyer *No. 29* proceeding via Susaki.) (Straight runs for fuel consumption.)

By January 30 all units had arrived at Ariake Bay and commenced the first training period (gunnery and engineering exercises, tactical and cruising exercises).

At Ariake Bay from January 30 to February 14, less *Yura* and second submarine squadron (gunnery and engineering exercises).

February 14, less second submarine squadron and *Yura*, sailed for Sukumu (southwest Shikoku), arriving there February 15 (straight run).

February 15–17 at Sukumu, less second submarine squadron and *Yura* (port fuel consumption).

February 17 sailed for Saiki Bay, less second submarine squadron and *Yura*, arriving there February 18 (tactical exercises en route).

At Saiki Bay February 18–22 (port fuel consumption plus training exercises).

February 22 sailed for Beppu, less *Yura* and second submarine squadron, arriving there February 23 (tactical exercises en route).

At Beppu February 23–26 (port fuel consumption plus training exercises).

February 26, sailed for off Mitajiri (less *Yura* and second submarine squadron), arriving there March 1 (exercises en route).

March 1–3, second submarine squadron left Kure for near-by waters for training exercises. (From December 16 to March 1 all submarines port fuel consumption.)

Second submarine squadron: From March 1 to March 26 in waters near Kure (submarine training exercises).

Second Fleet less second submarine squadron in waters near Mitajiri from March 1 to 18 (gunnery and training exercises).

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Fourth and fifth division less *Yura* assembled at Kure on March 18 and remained there until March 22 (port fuel consumption). During this period *Yura* continued training operations off Mitajiri.

Second Fleet and second submarine squadron from March 22 to March 29 in waters between Mitajiri and Kure engaged in fueling and final preparations for cruise. (Port fuel consumption plus 10 per cent additional.)

Second submarine squadron at Kure or near vicinity from March 26 to March 29. (Preparations for cruise—port fuel consumption.)

March 29 all units of Second Fleet less *Shiriya*, *Ro–28*, and *Mamiya* sailed from vicinity of Kure for Tsingtau.

NOTE.—For movements of *Shiriya*, *Notoro*, and *Mamiya* see movement sheets. *Ro–28* remained at Kure probably due to machinery breakdown.

Movements of reserve ships

First reserve: *Hyuga* at Hiroshima Bay for two days. *Hyuga* at Uno for one day.

NOTES.—At Kure (purpose of movements unknown).

Mutsu at Tachibana Bay for 5 days. Submarine *Ro–25*, no movements.

NOTES.—At Sasebo—purpose of movement unknown.

Second reserve: Second destroyer division, no movements. Sixteenth destroyer division, no movements. Twenty-first destroyer division, proceded from Ryojun to Sasebo on December 16, 1925; no further movements (see movement sheet). *Oi*, no movements *Yamato*, no movements.

Third reserve: *Haruna*, no movements. Sixth destroyer division, no movements. Second destroyer division, no movements. Seventeenth destroyer division, no movements. Twenty-fifth destroyer division, from Bako to Sasebo on December 17, 1925. Third submarine division, no movements. *Kuma*, no movements. *Tama*, no movements. *Tokiwa*, no movements. *Tsushima*, no movements.

Fourth reserve: No movements of any ships in this reserve.

The following ships though not officially in reserve have made no movements:

Tankers: *Tsurugizaki*, *Nome*, *Shiretoko*, *Sata*, *Ondo*, *Naruto*.

Target towing: *Settsu*.

Collier: *Muroto*.

Armored cruisers: *Asama*, *Nisama*.

Submarines: *Ro–20*, *21*, *22*, *56*.

Destroyers: *Urakaze*, *Hamakaze*, *Tokitsukaze* *Namikaze*, *Kuwa*, *Maki*, *Isokaze*, *Akatsukaze*, *Nokaze*, *No. 19*, *Tsubaki*, *Keyaki*.

JAPAN

NAVAL NOTES

[From the Japanese press]

Katsuriki to undergo alterations

The mine layer *Katsuriki*, attached to Kure Naval Station, will undergo internal alterations and repairs and her equipment will be improved in order to improve her efficiency.

Destroyers

The order for the construction of destroyer *No. 40* has been placed with the Sasebo Navy Yard. It is expected that destroyer *No. 40* will be laid down some time in October, 1926.

Destroyer *No. 32*, under construction at Sasebo, will be launched on July 12, 1926.

The destroyers *Shimakaze* and *No. 11* while engaged in torpedo practice in Tsushima Straits on June 16 collided. Neither of the destroyers was damaged seriously. Both of the destroyers under their own power proceeded to Sasebo for repairs.

Submarine I–58 (1,400 tons)

A distant view of the fleet submarine *I–58* was recently had at Yokosuka Navy Yard.

It was observed that the *I–58* has a large and unusual conning tower of cylindrical form.

The bow of the *I–58* appears similar in appearance to that of the *I–52*. The purpose of the peculiar construction of conning tower is not known.

Viewed from ahead the conning tower has the appearance of several concentric cylinders of different diameters, the large cylinders being ribbed externally for strength. The plating is apparently heavy.

Officers for Akagi named

The Official Gazette shows that Capt. R. Kaizu will command the airplane carrier *Akagi*.

Argentina requests bids for naval construction by Japanese firms

The Argentine Government has requested the Mitsubishi, Kawasaki, and Uraga Dockyards to submit tenders for the construction of 12 warships, consisting of 2 light cruisers, 8 destroyers, and 2 naval supply ships. It would seem that the Argentine Government has also asked for tenders from American and European shipyards; but the fact that a western nation is considering the possibility of placing orders for warships in Japanese shipyards reflects creditably on the development of shipbuilding in Japan.

It is believed that, with the exception of a small vessel constructed some three or four years ago by the Kawasaki Dockyards for the Siamese Navy, no warship has as yet been built in Japan to the order of any foreign government.

JAPAN

AVIATION NOTES

Airplane on "Nagato"

[From the Japanese press]

It was recently observed that an airplane of the Hansa type is now stowed on board the *Nagato* at Yokosuka Navy Yard under canvas at the base and just aft of the mainmast. A long wooden boom is stepped near the base of the mainmast. This boom is long enough to swing an airplane on board the *Nagato* from the water alongside.

On the top of No. 5 turret of the *Fuso* was seen a long, cumbersome wooden framework structure which from its general appearance is judged to be the turrent section of an airplane-launching device similar to the one described on pages 30–31 July Bulletin. At no previous time has there been any evidence that airplanes were permanently carried on board any ship of the Japanese Navy.

The observations reported above indicate that in all probability the launching device has proved successful and that the Japanese Navy, in consequence, has commenced equipping ships of the fleet with seaplanes.

Accident to dirigible No. 4, "No. 1 type"

The dirigible *No. 4*, "No. 1 type," while engaged in a practice flight over Kasumigaura on June 22, had a metal piece attached to the propeller became loose and thrown with great force against the gas bag, piercing both the upper and lower sides, causing the gas

bag to leak, and the dirigible made a forced landing in a pine grove, badly damaging the gondola. None of the crew on board were injured.

The dirigible will be taken apart and undergo repairs. The dirigible was scheduled to make night flights in the direction of Tokyo, but this has been indefinitely postponed.

NOTE.—Due to the above accident the Japanese Navy now has no dirigibles in service.

Aerial maneuver

In conjunction with the combined fleet tactical maneuvers to be held in Saiki Bay in the middle of July an aerial maneuver employing the most up-to-date aerial tactics will be carried out.

The planes participating will be as follows: Ten odd planes from the *Hosho*, *Notoro*, *Nagato*. Four pursuit planes from Kasumigaura. Three *F–5s* from Yokosuka. Four *F–5s* from Sasebo.

NOTE.—*Notoro* still employed as aircraft tender.

Torpedoes (aerial)

While the Japanese Navy is busily engaged in the improvement of its air service, special attention is being paid to study and experimentation as to the relative superiority of the aerial torpedo and aerial bomb.

Heretofore aerial torpedoes were considered less effective than bomb dropping. However, according to experiments which have been conducted the records made by aerial torpedoes are almost equal to that made by destroyers and submarines and it has been demonstrated that the firing of aerial torpedoes is even more effective than bomb dropping.

The American record is 44 per cent at a height of 2,000 meters. For an airplane carrying a torpedo to come down from a height of 8,000 meters to 2,000 meters requires only 1 minute and 50 seconds, assuming the speed of the plane to be 80 knots and that of the ship 20, and since records show that it takes 4,500 to 8,000 shots to bring down one airplane it is evident that this will be a great menace to ships not provided with a sufficient number of antiaircraft guns.

Training of pilots

The Japanese Navy will train boys between the ages of 16 to 19 for aviation duty. The proposed training is to begin next year.

The air bureau of the department of communications has for some time refused applications for training of pilots, whose training was intrusted to the army and navy. However, applications for training of pilots have again been invited and four applicants for seaplane training will be given an eight months' course of instruction at Kasumigaura Naval Air Station. This training will soon begin, and next fall a number of applicants for land training planes will be accepted. The monthly pay is 30 yen in addition to uniform, etc.

JAPAN

JAPANESE AIRPLANE CHARACTERISTICS

Mitsubishi No. 1, pursuit plane, 1924 model (improved 1921 model)

Purpose: Single-seater fighter for work with fleet.
Engine: 300 horsepower Hispano Suiza.
Duration: 2¾ hours full throttle at 1,000 feet.
Armament: 2 Vickers operated by C. C. gear, 500 rounds per gun.
Span: 29 feet.
Gap: 4 feet 11 inches.
Length: 22 feet 7 inches.
Surface: 290 square feet.
Chord: Top plane 6 feet, bottom plane 5 feet.
Total weight (i. e., fully loaded with petrol, ammunition, pilot, etc., as would operate under service conditions): 2,580 pounds.
Wing section: Halbron.
Speed: 1,000—142½ M. P. H. 5,000—142 M. P. H. 10,000—140½ M. P. H. 15,000—137 M. P. H.
Climb: 5,000 S. H.—3 minutes 24 seconds. 10,000 S. H.—7 minutes 56 seconds. 15,000 S. H.—14 minutes 18 seconds.
Construction: Normal; i. e., usual wood and wire constructions. Single bay. Steel interplane struts. Steel V under carriage. Top plane mounted on steel center section struts in the normal fashion and not attached directly to fuselage. Adjustable horizontal stabilizer. All controls are balanced and of standard shape and construction.

NOTES:—Pursuit type land plane well adopted to use on aircraft carrier, though slightly heavy. Tractor biplane, single strutter, span 29 feet. Hispano Suiza 300-horsepower engine extremely well stream lined. Lamblin radiators mounted under wings. Radiators were mounted under engine but caused excessive vibration. Balanced double ailerons, balanced flippers, and rudder. Mounts two fixed guns firing individually. Single-seater. Wings similar in

shape to SE5 and 4.5 inches thick. One-piece fuselage, four solid ash longerons, fabric covered. Hoisting rings on center panel. Easily detachable wing bays, attached to fuselage by pelican-hook arrangement. Estimated time of wing removal, four men five minutes. Fuselage filled with air flotation bags inflated by hand pump from cockpit. R. A. F. wires. Wings can be folded 80 degrees. Estimated length of take-off 250 feet. Landing speed very slow for this type plane, estimated 45–48 M. P. H. Reported service ceiling 6,000 meters. Said to come out of spin automatically in 1,500 feet. New control surfaces are of all metal construction, fabric covered. Two-bladed wooden propeller. Plane and engine of Japanese construction. Fan type gasoline pump to gravity tank.

Mitsubishi No. 2 observation plane, improved type

Purpose: Two-seater reconnaissance machine for work with fleet.

Engine: 300-horsepower Hispano Suiza.

Duration: 3¾ hours. Full throttle at 1,000 feet.

Armament: 2 Vickers operated by C. C. gear 500 rounds per gun. For pilot, one Lewis gun and scarf ring for observer.

Span: 39 feet, 6 inches.

Gap: 4 feet, 8 inches.

Length: 26 feet.

Surface: 405 square feet.

Chord: Top plane 6 feet. Bottom plane 5 feet.

Total weight (i. e., fully loaded with petrol, ammunition, pilot, observer, etc., as would be operated under service conditions): 3,250 pounds.

Wing section: Somewhat similar to single-seater, and of quite ordinary shape for moderately thin wings.

Speed: 1,000—130½ M. P. H. 5,000—130½ M. P. H. 10,000—125 M. P. H. 15,000.

Climb: 5,000 S. H. 4 feet, 36 inches. 10,000 S. H. 9 feet, 54 inches. 15,000 S. H. 17 feet, 3 inches.

Construction: Normal, i. e., usual wood and wire constructions. Two bays. Steel interplane struts. Steel V under carriage. Top plane mounted on steel center-section struts in the normal fashion and not attached directly to fuselage. Adjustable horizontal stabilizer. All controls balanced and of standard shape and construction.

Notes.—Land plane tractor biplane, 2 sets of struts, 300 horsepower. Hispano Suiza engine well stream lined. Two Lamblin radiators under center of plane. Fan type gasoline pump to gravity tank. One piece fuselage, four solid ash longerons, fabric covered. Wings of wood and metal construction, wooden entering edge, ribs

and solid spars, tubular steel internal bracing, and R. A. F. internal brace wires. R. A. F. wires throughout. Wings do not fold. Equipped tubular bomb racks, scarff ring in after cockpit, radio after cockpit, bomb sight bracket in floor of after cockpit. Two seater single control. Radio generator on top wing. Equipped with landing flares and landing lights. Hoisting hooks in center panel. Two bladed wooden propeller. Elevators all metal, fabric covered; ailerons, metal and wood fabric covered. Wings 4½ inches thick. 2½ degree angle of incidence, 2 degree dihedral angle. Balanced control surfaces. Equipped with air flotation bags throughout fuselage, inflated from pilot seat. Plane and engine of Japanese construction.

Mitsubishi No. 4 torpedo and bombing plane

Purpose: Torpedo carrier and bomber.
Engine: 450 horsepower Napier lion.
Duration: 2½ hours, full throttle 1,000 feet.
Armament: One torpedo of 1,500 pounds (or bombs equivalent to weight of torpedo), one machine gun after cockpit.
Span: 49 feet 2 inches.
Gap: 5½ feet.
Length: 32 feet 1 inch.
Chord: 6 feet.
Weight: (Full load) 5,775 pounds.
Weight: (Dead load) 3,410 pounds.
Lifting surface: 506 square feet.
Speed: 117 M. P. H. at 6,560 feet.
Climb: 4 minutes 30 seconds to 3,280 feet.
Radiator: Lamblin.

NOTES.—Land plane, tractor-type biplane, three sets of struts split under carriage. Two-bladed wooden propeller. One-piece fuselage, four solid ash longerons fabric covered. Solid spars in wings, tubular steel bracing and R. A. F. wires in wings. Wooden entering edge and ribs fabric covered. Double-balanced ailerons, balanced elevators and rudder, all control surfaces of metal construction. Underside of fuselage fitted to carry 18-inch torpedo. Bomb sight bracket in floor of after cockpit. Two Lamblin radiators mounted under stub wing sections. Wings do not fold. Radio generators mounted on top wing, Newton Brothers AD–2 type. Two-seater, scarff ring on rear cockpit, bracket for bomb sight in floor of rear cockpit, radio in rear cockpit, trailing antenna; single control. Mount for torpedo director sight on cowling on forward edge of forward cockpit. Tubular bomb gears for two 500-pound

bombs. Two small bomb racks for six 25-pound bombs, torpedo release from either cockpit. Opening in center panel 2 feet square. Built in hoisting hooks. Equipped with landing flare racks and landing lights. R. A. F. wires. Three degree dihedral angle, 4 degree angle of incidence. Small oil tank approximately 5 gallons. Three hundred liter main gas tank, 11 gallons gravity tank, fan type gas pump to gravity tank. Plane of Japanese construction. Fuselage fitted with flotation bags. Adjustable stabilizer.

Mitsubishi "Tiger"

Purpose: With slight modifications could be used as torpedo carrieer, heavy bomber or reconnaissance.

Engine: At present equipped with 450-horsepower Hispano Suiza, probably will be equipped with supercompressed Hispano Suiza 450 horsepower to 630 horsepower.

Span: 45 feet.

Gap: 5 feet 6 inches.

Cord: 5 feet 6 inches.

Gas capacity: At present 160 gallons. Designed to take additional tanks giving 12 hours cruising radius.

Speed: Maximum speed 140.5 M. P. H.

Armament: Two fixed guns in forward cockpit. Machine gun scarff ring in after cockpit, bracket for bomb sight in floor of after cockpit.

Construction: Standard construction throughout wood and fabric, tubular steel bracing. Single control. Double-balanced aileron, balanced controls throughout, adjustable stabilizer. Since this plane was seen at the Mitsubishi factory it has been completed and tested and has made several flights with an average speed of 185 kilometers per hour, the two longest flights being one of 3 hours and 15 minutes, a total distance 725 kilometers and one of 8 hours and 31 minutes, distance 1,530 kilometers.

Notes.—This plane was under construction at the Mitsubishi Aircraft Factory, and it is still in an experimental stage. It was stated that if the tests proved successful an endeavor would be made to sell planes of this type to both the army and navy. It was not possible to obtain exact classifications for this plane. The following details were noted: Two sets of struts, R. A. F. wires, folding wings. Inboard struts and center section of steel tubing, under carriage of welded steel, stream-lined steel tubing. Lamblin radiators. Built-in hoisting hooks. Two and one-half to three degree dihedral angle, three degree angle of incidence. Has hole 2 feet square through center panel. Metal control surfaces. Wood wing

construction. Under side of fuselage sufficiently braced to carry torpedo and easily convertible. Great number of inspection plates in wings. The plane is very well designed and the workmanship is excellent. All modern procedure and customs have been followed as far as practicable in the design and manufacture and an extremely well built and strong plane is the result.

Modified Fairey pintail

Purpose: Reconnaissance.
Engine: 400-horsepower Lorraine Dietrich.
Span: 48 feet.
Length over all: 36 feet.
Gap: 5½ feet.
Cord: 5½ feet.
Armament: Machine gun on scarff ring in after cockpit. Tubular bomb gears. Bracket for bomb sight in floor of after cockpit.
Construction: Wooden fabric construction, tubular steel engine section. Fuselage covered with veneer.

Notes: No specifications were obtained, but the following details were noted: This type is being manufactured in quantity production at the aircraft factory at the Yokosuka Naval Station with the exception of the pontoons produced at Aichi and the engines at Hiro. The plane is also being manufactured at the Nakajima Aircraft Factory at Ota. The pontoons are of wood with a metal bottom and rubber bongee shock absorbers built into the pontoons. Twin float tractor biplane, two sets of struts, 2-seater. Angle of incidence, 2½ degrees. Dihedral angle, 3½ degrees. The wings are about 5½ inches thick, of wooden construction, tubular steel and R. A. F. wires for internal bracing, fabric covered. The elevators are balanced. Has double balanced ailerons. All control wires are inclosed as much as possible, the rudder and elevator wires running through tubing inside of the fuselage and coming out of the fuselage near the tail, leaving only about 8 inches of the wires exposed. A two-bladed wooden propeller is used. The plane is equipped for radio (radio generator on upper wing). From the diameter of the fuselage it is believed that large gas tanks are carried and that the plane will be used as a reconnaissance plane. The forward wing spar is of a very heavy box type and the after spar is solid. Brackets were seen for flares. From the general appearance it is believed that this plane is a modified and improved Fairey pintail to be used as a reconnaissance plane. According to press accounts this plane has a maximum speed of 100 knots per hour and a 12-hour cruising radius.

Modified Hansa

At the Aichi Clock and Electric Works, Nagoya, a modified type of Hansa seaplane was seen. The following details were noted. Engine section is very heavily braced with 1½-inch steel tubing and apparently increased in size. It is believed that a larger engine is to be used. Floats are of metal, very heavily braced with five bulkheads. 5/32-inch rivets are used throughout pontoons and placed very close together. Two metal strips ½-inch wide and ⅜-inch high run entire length of pontoon about 6 inches from keel. None of these planes were completed and no information could be obtained concerning them, but production was on a quantity basis and the majority of the workmen in the plant were engaged in their manufacture. From the change in design of the engine section and the pontoons, it is believed that this type may be intended for catapult use or for service use with tender as a reconnaissance and observation plane.

Hansa type seaplane

Purpose: Advanced training, light bomber, photographic plane.
Engine: 200 horsepower Hispano Suiza.
Span: 45 feet.
Cord: 8 feet, tapering to 3 feet at wing tip.
Ceiling: 11,000 feet.
Armament: Machine gun on scarff ring in after cockpit. Bomb sight bracket in floor of after cockpit. Fifty-pound tubular bomb gears, bomb racks on each wing, also miniature bomb racks.
Construction: Fuselage is solid ash longerons with plywood covering entire fuselage. Standard wooden wing construction with solid spars, fabric covered, horizontal stabilizer is integral part of fuselage. All controls balanced.
Notes.—Tractor monoplane, twin floats. Equipped with brackets for landing flares and landing lights. Cruising radius about 4½ hours. Some planes of this type equipped with radio and used for fleet spotting.

F–5

All *F–5's* seen were of standard type equipped with two Rolls Royce, Eagle IX, 360 horsepower engines. Boats in use were of Japanese manufacture or the Short Brothers manufacture, hulls are of stitched veneer with extremely heavy bottoms. Lamblin radiators are in use. Radiator generator is mounted on steel tripod 3 feet high just aft of pilot's cockpit, radio cockpit just aft of pilot. Radio set

in use is the Marconi AD 6 type tube set with a reported satisfactory radius of 200 miles. There is a drift indicator bracket on bow, also a bracket for bomb sight, tubular bomb gears on each wing, scarff ring on bow and machine gun brackets in mechanics cockpit, brackets for landing flares and landing lights.

1925 model

A new type training plane was seen at Kasumigaura somewhat similar to the old Avro training plane called the 1925 model. It is a two bay tractor biplane convertible to land plane equipped with a 130 horsepower Benz engine, wing span 34 feet, length of fuselage 24 feet, cord 5 feet, gap 5 feet. Two main floats are used with wing tip floats and a tail float. It is a two seater with dual control, longerons are solid spruce, fuselage fabric covered. Wings are of wooden construction, fabric covered.

JAPAN

PROMOTION AND RETIREMENT OF NAVAL OFFICERS

Promotion is by selection for all grades except from midshipman to sublieutenant, second class. The selections are both "up" and "out." Relatively few selections "out" are made below the grade of lieutenant but above this grade the forced retirement provision is applied with increasing ruthlessness, reaching a maximum in the flag ranks. Selection "up" (rearrangement of precedence list) is seldom resorted to in promotion to captain and above, but it is drastically applied below the grade of captain and reaches a maximum in the lowest grades.

The selection board consists of about 20 flag officers, composed of the Minister of the Navy (senior member), vice minister, chief of the general staff, vice chief of staff, chiefs of all bureaus, commandants of all naval districts and naval stations and commanders-in-chief afloat. The board meets once a year on or not later than November 4. Promotions are as of December 1.

The minimum service required in grades to be eligible for promotion, the average services and ages in grades, and the ages of forced retirements are shown in the table below.

Rank	Minimum service required [1]	Average service performed	Average age in grade	Forced retirement age	
				Line engineer, hydrographic [2]	Staff corps
Sublieutenant, second class	1	2	22		
Sublieutenant, first class	1½	2-4	24	38	40
Lieutenant	4	5-8	27	43	44
Lieutenant commander	2	5-7	33	45	47
Commander	2	4-5	37	48	50
Captain	2	5	41	52	54
Rear admiral	3	4	46	56	58
Vice admiral	None.	6-7	50	60	62
Admiral	None.		56	65	

[1] One-third additional constructive service is given for all sea duty and air service.
[2] Promotions are invariably based on the average service in grade (column 3), therefore age in grade retirements have never been effective except for admirals.

No officer can be forced to retire for other than physical or disciplinary reasons who has had less than 11 years' commissioned service, but voluntary retirement with less than 11 years' service is sometimes permitted. The Minister of the Navy is empowered to demand the retirement of any officer (except those with less than 11 years' service) at any time. In actual practice the selection board is delegated this authority and advises the minister which officers shall be retired. Two methods of retirement are used, namely: (a) Retirement in grade, and (b) immediate retirement after promotion to next higher grade. The ratios of using these two methods of retirement in the various grades are about as follows:

Lieutenant	6 (a) to 1 (b)
Lieutenant commander	2 (a) to 1 (b)
Commander	1 (a) to 2½ (b)
Captain	5 (a) to 1 (b)
Rear admiral	3½ (a) to 1 (b)
Vice admiral	Practically all retired under (a).

When officers, due to ill health or some other cause not reflecting upon their professional ability, can not perform active duty, they are placed on the "waiting list" for one year with 80 per cent pay. At the end of that year if still unfit for active duty they are placed on the "unemployed list" for one more year with 60 per cent pay. At the expiration of this second year, if not ordered to active duty, retirement is mandatory.

For disciplinary reasons officers are sometimes placed on the "suspended list" with 30 per cent pay.

Officers on the "waiting list" are eligible for promotion, but those on the "unemployed" and "suspended" lists can not be promoted.

Officers when retired are placed in the reserve, where they remain for a varying number of years, dependent upon age and rank at time of retirement.

The fundamental principle upon which promotion is based is that officers shall serve in each grade the number of years specified in column 3 of preceding table. The percentages of officers in each grade are not fixed by law, but such percentages have been approximately determined and are fairly closely adhered to. To carry out this system of promotion, officers are, generally speaking, considered available for selection by groups. The chief of the personnel bureau is required to supply the selection board with all necessary data pertaining to the total number of officers in each grade that should be considered for promotion, the numbers to be promoted, retired, etc.

In actual practice promotions operate as follows:

(a) From midshipman to sublieutenant, second class (ensign) it is by seniority. The special post-graduate courses in gunnery, torpedoes, submarines, etc., have not been completed by this time.

(b) From sublieutenant, second class (ensign) to sublieutenant, first class (lieutenant junior grade) selection "up," i. e., rearrangement of precedence list, is extremely drastic. There are few retirements because the 11 years of compulsory service have not been completed. Occasionally, however, officers are passed over and held in this grade until they can be forced to retire.

(c) From sublieutenant, first class (lieutenant junior grade) to lieutenant both selections "up" and "out" are made. The rearrangement of precedence list is again drastic but the retirements are few. In December, 1925, 187 were considered for promotion, 165 were promoted, 20 were passed over, and 2 were retired in grade. Some of those passed over will be retired before the next selection board meets, others will probably be given one more chance.

(d) From lieutenant to lieutenant commander same as (c) except more moderation exercised in rearranging precedence list and greater number of forced retirements. In December, 1925, 198 were considered for promotion, 119 were promoted, 8 of whom were immediately retired as lieutenant commanders, and 89 were passed over. The average annual attrition in this grade is about 4⅓ per cent.

(e) From lieutenant commander to commander about the same as (d). In December, 1925, 140 were considered for promotion, 97 were promoted, 12 of whom were immediately retired as commanders, and 43 were passed over. The average annual attrition in this grade is about 3⅔ per cent. This is exclusive of those retired immediately after being promoted lieutenant commanders.

(f) From commander to captain there is very little rearrangement of precedence, except that those officers who are to be retired immediately after promotion are placed at the bottom of the list promoted. In December, 1925, 93 were considered for promotion,

68 were promoted, 17 of whom were immediately retired as captains, and 25 were passed over. The average annual attrition in this grade, exclusive of those retired immediately after promotion to it, is about 2 per cent.

(g) From captain to rear admiral, from rear admiral to vice admiral, and from vice admiral to admiral there is no rearrangement of precedence in promotions. In December, 1925, there were 21 captains remaining on the active list who attained that rank in December, 1920. In accordance with established policy all were promoted en block to rear admirals. Of this number, 6 were retired immediately after promotion. At the same time 19 additional captains, who were not due for promotion, were retired in grade. At this selection (December, 1925) 8 rear admirals (all having obtained that rank in December were due for promotion and were promoted en block to vice admirals, two of whom were retired immediately after promotion. At the same time 23 rear admirals, not due for promotion, were retired in grade. No vice admirals were promoted to admiral but 11 were retired in grade. One admiral was also retired in grade. The average annual attritions in the above grades, exclusive of the forced retirements immediately after promotion, are as follows: Captains 12 per cent, rear admirals 12 per cent, vice admirals 13 per cent.

By this means of extremely drastic selection, the Navy is able to keep officers of all ranks on their toes at all times, and one must prove himself well above the average to reach the higher ranks. The system is so generally popular that it undoubtedly is operated with the maximum of fairness.

JAPAN

MISCELLANEOUS NOTES

[Source M. I. D.]

Navy to build oil tanks underground

According to the Japanese press, the oil tanks now in use by the Japanese Navy are of the type built on the ground and as these are subject to attack by airplanes and also easily damaged by earthquake it has been decided to build tanks underground and experimental tanks of the underground type are being built at Yokosuka, Sasebo, and Hiro.

The tanks to be built at Hiro Navy Yard will be built in the reclaimed ground near the shore and storehouses of barrack type will be built over the tanks. Those to be built at Sasebo will be covered

with earth to a depth of 3 feet on which vegetables will be cultivated to disguise the tanks.

If the experiments prove successful the underground tanks will be adopted, even though the underground tanks are less convenient for drawing out oil, this will be offset by the other advantages.

A propaganda committee on national defense

A propaganda committee on national defense has recently been organized by the Japanese War Department. Major General Hata, at present chief of the military affairs bureau of the war department, is chairman, and Colonel Sakurai, the author of "Human Bullets," and at present chief of the press section, is secretary. All section chiefs of the war department general staff and department of military training are members of this committee.

It has as its object popularizing the army and its national defense plans, thereby promoting "spiritual mobilization" throughout the Empire. Definite plans have not as yet been formulated.

It is believed, however, that the first major effort of this committee will be put forth this fall during the grand maneuvers.

The army authorities are making a valiant and more or less successful effort to restore the military to its one time prestige, and this committee can be depended upon to put over its propaganda program with the usual Japanese thoroughness and attention to detail.

Cost of world war to Japan and secret-service expenditures

The Japan Jiji says that it has just been ascertained that the sums which were expended on the Tsingtao campaign, the naval operations in the Mediterranean and the South Seas, the Siberian expedition, the occupation of Saghalien, and other military and naval undertakings consequent upon Japan's entry into the European war between the fiscal years 1914–15 and 1924–25, amounted to ¥899,534,000, or ¥20,269,000 less than the total estimates. These payments were made out of the special account of war expenditure temporarily created for the purpose. They appear nowhere in the budget and were not made known until last year. Of the whole expenditure ¥641,000,000 was expended by the war office, and ¥258,000,000 by the navy department.

The secret-service fund, which formed a topic of much heated discussion in the last session of the Diet, is estimated at ¥24,470,000 for the war office and ¥1,700,000 for the navy department. As can be seen from the table given below, a large proportion of the mili-

tary secret-service fund was spent by the cabinets in which General Tanaka, the present president of the seiyukai, served as Minister of War:

Fiscal year	
1914–15 Okuma cabinet (General Oka)[1]	¥77,550
1915–16 Okuma cabinet (General Oka)	33,750
1916–17 Okuma and Terauchi cabinet (Generals Oka and Oshima)	98,400
1917–18 Terauchi cabinet (General Oshima)	235,000
1918–19 Terauchi and Hara cabinets (Generals Oshima and Tanaka)	7,705,800
1919–20 Hara cabinet (General Tanaka)	10,619,782
1920–21 Hara cabinet (General Tanaka)	2,790,257
1921–22 Hara and Takahashi cabinets (Generals Tanaka and Yamanashi)	2,670,100
1924–25 Kiyoura and Kato cabinets (General Ugaki)	250,000

NETHERLANDS

DUTCH EAST INDIAN PORTS

[Source O. N. I.]

Owing to the rapid strides shipping had made during late years, the necessity of improvement and modernization of the principal ports in the Dutch East Indies was urgently felt 15 years ago. In connection therewith the Netherlands Indian Government invited two well-known experts on harbor works to give their advice as to the way in which the harbor improvements should be carried out.

In connection with the plans and the advice of these experts, the modernization of the principal Netherlands Indian ports has since been undertaken.

The scheme was mainly based on the following:

(a) In a technical sense: To have basins which at all times could accommodate the latest ships, the dimensions of which for the time being were fixed as follows: 1,000 feet length, 100 feet width, and 40 feet draft; quays with up-to-date facilities, warehouses directly connected with the railways, ordinary road and lighter transport; the timely securing of extensive fields for extension purposes and the housing of the harbor workmen, and by applying the very best precautions from a hygienic and social point of view.

(b) In a financial sense: The so-called productiveness principle—that is to say, that the port covers its own expenses without trying to make a profit, with this understanding, however, that this principle, which in itself is very just, must not be carried out so strictly that

[1](The names given in parentheses are those of war ministers.) The army budgets for 1925–26 and 1926–27 each carry about ¥341,000 under the heading "Secret funds."

the economic interests of the port in the hinterland will be damaged by it.

(c) In an operating sense: The creation of a port authority, including all authorities connected with the port, which as a central body in the name of the Government, who remains the owner of the port and supplies all the capital, operates the port management in the widest sense, at the same time not losing sight of the fact that the private initiative should be left a free hand as much as possible as to the actual running of the port.

These objects have not yet been reached. As regards the technical claims, not one of the large ports is yet accessible to ships with a draft of 40 feet. Samarang as yet has no facilities for a direct connection of ships with the shore.

In view, however, of the present economic conditions no new works will be started in the future in the large ports except perhaps in Samarang. As regards the harbor management, a harbor director has been appointed temporarily in the different ports, assisted by an advisory board. It is, however, not certain whether the proposed system of appointing harbor boards will be carried out.

According to the size of their imports and exports the Netherlands Indian ports are divided into:

(a) Large ports.
(b) Small industrial ports.
(c) Small ports.

Large ports, numbering seven, are considered:

Java:

Tandjong Priok (Batavia).
Sourabaya (Tandjong Perak).
Samarang.
Tjilatjap.

Sumatra:

Belawan Deli (Medan).
Emma Harbor (Padang).

Celebes:

Macassar.

Among the small industrial harbors are considered:

Java:

Batavia.
Cheribon, Tegal, Pekalongan.
Pasuruan, Probolinggo.
Banjuwangi.
Panarukan.

Borneo:

Bandjermasin.

Sumatra:
- Benkulen.
- Sibolga.
- Assahan.
- Palembang.

Amboina:
- Amboina.

Celebes:
- Menado.

Bali:
- Benoa.

There are more than 450 small harbors.

DESCRIPTION OF THE LARGE HARBORS

Tandjong Priok, harbor of Batavia. The Tandjong Priok Harbor was constructed between the years 1877 to 1883.

Tandjong Priok, situated about 5½ miles east of Batavia, consists of an outer port closed in by long sea piers and three inner ports, of which the first one is 3,300 feet long and 555 feet wide, the second one 3,000 feet long and 450 feet wide, and the third one about 3,000 feet long and 645 feet wide.

The channel in the outer harbor is 750 feet wide and has a depth of 28.5 feet below low-water mark. The first inner port is suitable for ships of 25.5 feet draft, the second for ships of 27 feet draft, while the third inner port has been designed for ships of 36 feet draft. The northern part of the western side of the second harbor can be made accessible to ships of 36 feet draft by dredging it.

The inner ports all have quays with a large number of movable electrical cranes. Adjoining the quays are also the large modern warehouses of the port authority and those of private shipping companies.

Between the second and third inner port is a storage place for coal with powerful electrical coal machinery.

Besides these principal basins there are a few smaller ones, among others the one for the two dry docks, on the west side of the first inner port, while east of the third inner port a fishing harbor is planned.

The whole port is connected by a system of canals, with the chief shipping canal to Batavia used by lighters. Batavia is furthermore connected with Tandjong Priok by a good ordinary road and a double-track railway.

At the port are various installations for industries connected with shipping, while land has been reserved for the erection of other works and factories.

There is a flying station. Besides, there are native and European quarters.

Tandjong Priok is an entirely modern port, completely fitted out for the needs of modern shipping.

The harbor works, without depreciation, upkeep, railway construction, and the works erected by private concerns, required up to the end of 1922 an expenditure of $20,600,000, while the expenditure for 1923 has been estimated at $1,800,000.

In 1922, 4,076 trading vessels with a tonnage of 3,902,475 net registered tons called at Tandjong Prock and 4,097 with a tonnage of 3,918,022 tons sailed.

The total customhouse receipts amounted to $7,835,316.

By customhouse receipts are understood the import and export duties, duty on spirits (only for Batavia, Sourabaya, and Samarang) and the duties on petroleum, matches, and miscellaneous.

Sourabaya.—Sourabaya has a very good roadstead, protected by the island of Madura, while the Kali Mas, one of the mouths of the Brantas River, affords every facility for transportation by water, right into the heart of the city.

Until recently the ships anchored in the roadstead, while the discharging and loading was done by means of lighters.

With the increasing growth of the commerce of Sourabaya, the principal sugar port of Java, the need of a direct connection between the ship and the shore was more and more felt.

On the west side of the mouth of the Kali Mas, breakwaters or piers have been constructed. Off the north breakwater, the outer quay is 3,600 feet long and shows 27 feet of water at low tide.

The inner quay has a length of 2,400 feet with also 27 feet of water at low tide.

Alongside the west pier of the basin, a wharf of 2,760 feet length has been constructed (Coal or Genoa Quay), while the Holland pier, built out in the basin which was completed in 1925, offers a space of 4,950 feet length. The depth alongside these quays is respectively 30 and 36 feet. For the time being, however, only ships up to 24 feet draft can reach the port once every 24 hours (through the west gate). The eastern part of the basin is fitted up as a port for lighters. Furthermore, in the northeastern corner a harbor has been reserved for the three floating docks of 14,000 tons, 3,500 tons, and 1,400 tons capacity.

For the tankers of the Standard Oil Co. of New York a wharf has been built north of the Genoa quay, near the mouth of the harbor basin.

On the west side of the west border of the harbor basin a new shipping canal has been dug, the Kali Perak, while the Kali Mas

has been improved as much as possible, by broadening it and by the construction of stone walls alongside the banks.

Also this port is fitted up with all mechanical contrivances and other installations which are required in modern harbors. All quays and warehouses are connected by direct wide roads and railways with the industrial centers in the hinterland.

From 1912 to the end of 1922, 21⅓ million dollars has been spent on the harbor works, not counting the construction of railroads and the expenditure by private concerns, while the expenses for 1923 were estimated at about $2,800,000.

In 1922, 7,538 trading vessels called at Sourabaya with a tonnage of 3,482,333 registered tons, and 7,537 trading vessels sailed with a tonnage of 3,480,213 registered tons.

The total customhouse receipts amounted to $9,490,000.

Samarang.—Samarang has only an open roadstead for seagoing vessels, where the weather can be so boisterous during the west monsoon that the discharging of goods into lighters is only possible on the lee side of ships, while often the traffic with the shore has to be suspended altogether.

Plans for the construction of a protected harbor for ocean ships are projected, and a few preliminary measures have been taken, but in view of the high expenses of such a seaport and the unfavorable financial and other conditions, these plans have not yet been carried out.

Also the lighter traffic experienced difficulties in the narrow harbor channel. Therefore it was decided in 1910 to construct a harbor for the lighters.

This new harbor construction is situated on the east side of the harbor channel, the western pierhead of which was extended to 4,800 feet to seaward, so as to prevent the mouth from silting up and to be able to keep up a greater depth.

The lighter harbor has a broad front, branching to the shore in two customhouse basins and a fishing harbor. This port and the customhouse basins are protected over a total length of nearly 4,200 feet. When these basins, owing to the increased lighter traffic became congested, another basin was constructed.

A small dry dock and two stationary steam cranes with a lifting power of 10 and 25 tons, also a few small hand cranes and 8 electrical cranes of 1½ to 5 tons capacity, belong to the outfit of the port.

There is sufficient warehouse space at the port, while excellent connections by road and rail with the hinterland exist.

The shipping traffic of Samarang during 1922 consisted of 2,317 arrivals of trading vessels with a tonnage of 3,261,132 registered tons and 2,319 sailings of trading vessels with a tonnage of 3,261,485 registered tons.

The value of the imports and exports amounted to: Imports, $2,705,760; exports, $43,698,461. The total customhouse revenue was $4,700,276.

Tjilatjap.—This port is the most favored by nature of all the harbors of Java. Tjilatjap is situated on a small peninsula bordered on the east side by the Indian Ocean and on the west side by the Donan River. The mouth of this river, which has an entrance of such depth that ships of 21 feet draft can enter at all times and those of 24 feet draft at high tide, offers a perfectly safe anchorage against the swell of the Indian Ocean, protected as it is by the island of Nusa Kambangan lying opposite.

The hinterland of Tjilatjap also is not without importance. In spite of all these favorable conditions, owing to its isolated position on the south coast of Java, outside the ordinary shipping routes, this port has not reached the same prosperity as the ports on the north coast, described above, though a slow development has been noticeable.

About 1910 renewals and extension works were started here also.

At present the port has two concrete wharves of respectively 1,224 feet and 360 feet, affording a mooring place for ships of 21 feet and 24 feet draft.

The dredging of the entrance to obtain a depth of 27 feet at low tide, a work that is connected with the improvement of the harbor of Tjilatjap, was taken in hand but was stopped in 1921 in connection with the economies that had to be enforced owing to bad times.

By a side line to Maos, Tjilatjap is connected with the railway system of Java.

In 1922, 133 ships with a total tonnage of 317,920 registered tons called at Tjilatjap, while 134 ships sailed from there with a total tonnage of 317,765 registered tons.

The customhouse revenue was $116,468.

Macassar.—Macassar is, by its geographical position, the natural port of the eastern part of the archipelago.

It has a roadstead which is partly protected by a number of coral islands.

Until a short while ago, Macassar only possessed a wharf on screw piles of 1,500 feet length and 30 feet width, running parallel with the shore, which was connected by footbridges with the shore. From 1912 to 1918 considerable improvements have been carried out, however, consisting of a caisson quay of 4,020 feet length, built out in the sea, offering to the ships a depth of 27 feet to 30 feet at low tide.

Behind this quay, on the south end of same, a harbor for lighters with a length of 840 feet and a depth of 9 feet was constructed.

To the north of the quay, land has been banked in, intended for the storage of coal and petroleum.

For the protection of the quay, a breakwater has been constructed over the coral islands and the banks in front of the roadstead.

The figures for the traffic of Macassar for 1922 are: Arrival of steamers, 4,542; tonnage, 1,308,481 registered tons. Sailings, 4,538; tonnage, 1,307,421 registered tons. The total customhouse revenue was $1,250,548.

Padang (*Emma Harbor*).—Emma Harbor was constructed in the years 1880–1890 in the northern half of the Queen's Bay, on the west coast of Sumatra, in the first place with the purpose to create an opportunity for the shipping of Ombilin coal and only in the second place as a harbor for Padang.

By two breakwaters, of which one 2,700 feet long has been constructed, running perpendicularly into the sea and the other one 780 feet long, parallel with the coast across a coral bank, a harbor surface of about one-third square mile has been formed.

There is 27.9 feet of water in front of the landing stages at low tide.

A start was made in 1919 to deepen the approach to the harbor to 28.5 feet, but the work was suspended in the beginning of 1921, owing to bad times.

There are 4 screw-pile wharves with a total length of 1,299 feet for the mooring of steamers. Furthermore there is a coal wharf, a salt wharf, a petroleum wharf and a dynamite wharf.

Emma Harbor is well fitted for loading and discharging of coal. The outfit consists of:

(a) A coal shoot with a capacity of 300 tons per hour.

(b) Two electric coal conveyors, each with a capacity of 120 tons per hour.

(c) A floating coal conveyor with a capacity of practically 40 tons per hour.

By the alteration of the route of the passenger steamers of the Rotterdam Lloyd, which formerly used to call at Emma Harbor on the outward as well as on the homeward journey to the Straits of Malacca, this harbor has suffered a severe loss indeed, though the goods traffic will not become less from it.

In 1922 the number of arrivals of ships amounted to 1,813 with a tonnage of 859,364 registered tons, and the number of sailings was 1,807 with a tonnage of 856,891 registered tons.

The customhouse at Emma Harbor collected during 1922 in import duties, $642,012; in export duties, $96,664. The total revenue amounted to $1,038,515.

Belawan Deli.—The enormous strides, which the development of Sumatra's east coast took on account of the fast extension and growth of the estates in this district, led to the construction of a harbor

at the mouth of the deep Belawan River on the island of the same name.

This harbor was however greatly handicapped by the bank at the entrance of the river. In connection with the great need of a good connection by large ocean steamers, powerful dredgers were stationed there to make a deep channel and keep this up.

Belawan has at present a wharf of 2,220 feet in length at the old coastal establishment, while the coastal establishment has a wharf 543 feet in length accessible to ships with a draft of 24 feet, and two coaling wharves each 90 feet long. Besides these there is a separate basin, the so-called coconut leaf harbor for the native sailing smacks which land the large parcels of coconut leaves, required for the tobacco sheds and other buildings on the estates. The latest improvement is the construction of a quay 2,790 feet long with sheds behind, for large ocean steamers with a draft of 36 feet at low tide. The harbor is connected by an ordinary road and by a railway with the interior. The approach to the river and the river itself are continuously dredged, so as to keep the depth on the same level. At present there is a minimum depth of 21.9 feet at low tide over a width of 180 feet in the channel, so that ships of 21 feet draft can be accommodated at all times and ships of 25.5 feet draft can enter the port at the daily high tide.

The number and tonnage of the ships which arrived at Belawan in 1922 and sailed from there amounted to: Arrivals 2,084, tonnage 1,265,018 registered tons; sailings 2,101, tonnage 1,274,205 registered tons.

The customhouse receipts amounted to a total of $1,819,012.

Of the other fairly important ports of the Dutch East Indies, Sabang occupies a special place in connection with the purpose for which it was constructed.

The extremely favorable situation of Sabang on the island of Pulu Weh, close to the north entrance of the Straits of Malacca, on the regular navigation routes to the countries of East Asia and the western territory of the Pacific Ocean, makes Sabang an ideal coaling station.

The harbor itself is a naturally protected small bay with a favorable depth up to the coast and a good anchorage. The harbor has excellent facilities for bunkering coal by 5 electrical movable cranes and a bunker lighter with a capacity of 300 tons per hour.

Besides, there is a small dry dock of 2,600 tons capacity, which in a short time will be replaced by one of 5,000 tons; also slipways for the construction of small ships and lighters up to 1,000 tons.

The harbor is managed by the "Sabang Bay Harbor and Coaling Station, (Ltd.)," in which the Government is interested for a considerable amount.

The traffic in 1922 amounted to: Arrivals of trading vessels, 632; tonnage, 1,321,909 registered tons. Sailings of trading vessels, 633; tonnage, 1,321,909 registered tons.

In Java, Cheribon and Banjuwangi are important seaports, the first for sugar and the latter for products from Java's east corner, such as sugar, copra, coffee, and tobacco. Both ports have open roadsteads and lighter ports with quays and warehouses.

Also Probolinggo, Pasuruan, Pekalongan and Tegal are ports of importance, Amboina, situated on the island of the same name, is the place where for centuries the commercial life of the Moluccas has been concentrated. The harbor is a very beautiful, naturally protected basin on the shore end of Ambon Bay. The roadstead of Ambon is 12 to 19 fathoms deep. There is a concrete wharf and plenty of space for warehouses.

Menado is the port of the northern peninsula of Celebes and the Sangir and Talaud groups of islands. It is situated on a bay at the mouth of the Menado River and has a considerable export of copra and coffee. In the Menado River an obstructive sand bank has been formed, which however, is dredged regularly.

Balik Papan, Bandjermasin and Pontianak are the important ports of Borneo.

Balik Papan, situated on an arm of the sea, running deep inland, is the petroleum harbor for the important petroleum fields of the Royal Dutch on the large island.

Bandjermasin, situated on the Baritu River 18 miles from the mouth, is the central collecting station of the enormous territory of this large river with its branches.

The place is accessible to large ocean steamers and has a considerable export of timber, jungle products, and coal.

Pontianak is situated 11.4 miles from the sea on one of the branches of the large Kapuas River, which practically covers the whole of the western district of Borneo.

The harbor installation of Pontianak consists of a wooden wharf of 900 feet in length where large ocean steamers can moor.

The exports from Pontianak are similar to those from Bandjermasin.

Palembang is the port of southeast Sumatra. It lies 54 miles from the coast on the broad Musi River and is accessible to large ocean steamers. The landing stage, on screw piles of 750 feet in length, is connected by three bridges with the shore. The depth of the water at the wharf is about 18 feet at low tide. Besides this wharf with the installations behind it, Palembang has several large and small mooring places. Palembang is a very important place with a promising future. In the neighborhood is found the most important petroleum center in Sumatra of the Royal Dutch Petroleum Co.,

also the newly opened Bukit Asem (Lematang) coal mines of the Government. At the same time it is the terminus of the main line of the growing railway system of south Sumatra.

At the junction of the branch river Ogan with the Musi at the terminus of the railway, a wharf has been constructed for ocean steamers, which makes it possible to load the goods carried by the railway direct into the steamers. Next to it is a coal chute for the handling of the Lematang coal.

MANAGEMENT AND OPERATION OF THE PORTS

The operation of the ports of the Dutch East Indies must be carried out in such a way that besides the costs of administration also the interest and the paying off of the capital invested in the harbor works are earned.

As much as possible is left to private initiative.

The harbor board itself has only a small part of the quays with the land and warehouses lying behind in its own management, just enough to be able to have a say in the manipulation of goods in the harbor and the fixing of tariffs and to prevent the forming of a trust.

A few branches have therefore been monopolized, such as the mechanical outfit of the normal types, the supply of water and electricity.

The harbor is managed by a director, by preference an engineer, with an operative, administrative, and technical staff.

Besides the managing board an advisory board is appointed in each port to give advice to the director. This committee is an advisory body, which must be consulted by the director of the harbor, who is at the same time its chairman, but which also, on its own account, may announce its wishes and recommend measures or steps to be taken.

In the committee, the constitution of which varies with local conditions, all parties interested in the harbor are represented as much as possible.

The harbor service is under the department of public works, the head of which is the highest authority with regard to harbor matters.

NICARAGUA

AVIATION ACTIVITIES

Creation of a ministry of aviation

[Source reliable]

The Nicaraguan Congress has ordered the following:

The Senate and House of Deputies of the Republic of Nicaragua order the following reforms to the law of March 23, 1926:

ARTICLE 1. To create the ministry of aviation the executive power will attach to the ministry all the employees necessary for the administration and supervision of all that concerns this branch and for the promotion of its effective development in the country, study and submit for the approval of the house all those laws on aviation that can be applied to this country. Whether for the military, civil, commercial, or other branches of aviation, and all that will promote the improvement and safety of aerial navigation. The minister of aviation shall have the supervision and administration of all branches of aviation.

ART. 2. For the creation of the ministry of aviation, of the military aviation corps, the purchase of airplanes for the school of aviation, for the construction of landing fields, and other expenses, the President may take from the treasury any funds available included in the budget for the maintenance of the aerial service of the government.

Because of his knowledge of aviation and his close friendship to General Chamorro it is said that Gen. Humberto Pasos Diaz will head the ministry of aviation. An American, James Rutledge, will have actual charge of aviation, both commercial and military, and will instruct the 50 odd cadets who have volunteered for this service.

Two of the four airplanes of the Swallow type have arrived from the United States and been placed in commission at a hangar built for this purpose some 2 miles from Managua. Several flights have been made over Managua and as far as Granada and Leon. A trip is being planned to Bluefields for the first of next week.

Much interest has been shown and many articles have appeared in the local press praising the new line of defense and the ability of the present régime now to quell promptly any future uprising at Bluefields.

RUSSIA

NOTES ON RED ARMY

[From the German press]

The building up of the Red army, pursued by the Soviets during their eight years reign, has resulted in a certain stabilization of the military forces. As regards organization and equipment the difference is undoubtedly enormous between the condition of utter corruption and collapse to which the revolution had reduced the remains of the old imperial army in 1918, or the subsequent savage brutality of the Red guards, and the present system of regular army organization, military training, and military service legislation.

The structure of the Red army reveals the political intentions of the Soviets and their adherence to Marxist dogmatism. The militia system has always been favored by socialism in preference to that

of standing armies. As, however, a purely militia system is not possible in Russia for various reasons, the present system is a clever combination of both. Military service is obligatory for all male subjects of the Soviet Republic from the age of 19 to that of 40. Of these, however, only those who have the right of vote, i. e., the "workers," are permitted to enter armed military service; the others, that is, the last remnants of the "bourgeois" classes, are not allowed to carry arms; in peace time they are subject to a military tax, and in war time they are formed into "working battalions." The time of actual active service in the standing army varies from two to four years, but the greater part of the recruits are enrolled in the territorial formations, where they only have to present themselves for a few weeks training every year.

The red army consists therefore of the regular troops of the standing army and of territorial formations, in which only the staff of the leaders is permanent, whereas the whole mass of the men changes every two weeks. Altogether there are always somewhat over half a million men under arms.

The problem of the officers staff has been solved in a very dexterous manner. By the way, the term of officer was abolished in 1918 and replaced by that of leader and recently by that of commander. In the beginning of the revolution the "leaders" were elected by the men. Later on they were appointed by a committee made up of politically reliable elements. The inefficiency of these leaders, however, compelled the Soviets to have recourse to the services of former imperialistic officers, whose political reliability was extremely questionable. Political commissars were appointed to keep them under constant supervision. Meanwhile the organization of military training of politically desirable elements was taken in hand on a very large scale, beginning from the lower schools and ending with the military high schools. Recruits having a certain educational qualification, which, owing to the present regulations, can only be attained by the sons of the working classes, go through a stage of military high-school training, after which they do one year's active service and are then transferred into the territorial army as reserve commanders. The office of political commissar has recently been abolished and replaced by that of "political instructor of the army."

Certain sections of the red army are designed for special purposes; such are the ordinary police troops, including the justice and frontier guard and above all, the troops of the political police, the GPU, which has replaced the former Teheka. Both commanders and men of the GPU must answer to particularly severe political and physical requirements. They are designed for the maintenance of the Soviet régime and are specially organized for that purpose;

they have no artillery but are strongly armed with machine guns, tanks, and armored cars peculiarly appropriate for street fighting.

The red army is a powerful instrument for the political education of the people. The entire youthful male population is subjected to a systematic training, military, political, and athletic. Although active military training only begins at the age of 21, preliminary military training is obligatory from the age of 19. The whole country is covered with a network of educational centers. Political and military courses are included in all the common and higher schools. The recruits are politically educated by the commissars and the political teachers, as well as in the political military clubs. The revolutionary council of war—the supreme military power—has a special section for the political administration of the army, the so-called PUR. The same object is pursued by film representations, publications of all sorts, sportive organizations, etc. The headquarters of all the sport or athletic organizations, the "council for physical culture," and all the local sport councils are completely under the control of the military authorities. The ultimate object of this educational system is to turn every recruit into an adherent of the Soviet Government, who may be relied upon to support it when he returns to his native village or to his factory.

Scientific activities within the army are extensively encouraged. The "Society for Military Science" pursues the promotion of military knowledge not only among the leaders of the army but also among the general public. One of the most diligently pursued objects is the establishment of a close contact between the army and the working and peasant population. Societies for this purpose have been founded on a very large scale, such as the Aviachim and the Society of the Friends of Aeronautics and Chemistry. They hold lectures all over the country; there is hardly a village or a factory where they have not established a cell; they number hundreds of thousands of members and succeed in collecting very considerable sums for the development of the air fleet and of military chemical institutions.

The Soviet military budget increases from year to year. In 1924–25 it rose from 458,900,000 to 527,500,000 rubles and it has risen to 635,500,000 rubles in the present year. Its percentage proportion to the total budget, however, has gradually decreased from 18.5 per cent in 1923–24 to 16.8 per cent in 1924–25 and 15.9 per cent in 1925–26.

The systematic transformation of the standing army into a militia designed only for defense is a proof of the peaceful intentions of the Soviet Government, which, however, are not due to its love of peace but to its recognition of the impossibility of war. Should Russia be involved in a war, the whole Russian army would turn out

to be nothing but a host of armed peasants, and the Soviet authorities are very well aware that the Russian peasant does not wish to fight and can not be compelled to do so unless by the fear of losing the land he has gained by the revolution. Neither would a standing army be any good for quelling internal disorders, because it could not be relied upon in the event of peasant uprisings. This is one of the chief reasons for the creation of the GPU.

It is therefore reasonable to assume that the Soviet Government is sincere in its advocation of disarmament. Its latest ambition is to impress the world with its technical and economic achievements which are to proclaim the truth of its revolutionary principles. The Moscow leaders would be willing to invest part of the money hitherto spent for armament into economic concerns, but their distrust of the outside world prevents them from making the first step in disarmament. This distrust has probably been strengthened by the recent disregard of their wishes in respect of the place of meeting of the conference of disarmament.

Aviation

Aviation in Soviet Russia.—In June, 1925, the airfleet numbered 625 reconnaissance planes, 296 battle planes, and 66 bombers, totaling 987 machines arranged in 98 échelons. Each échelon consists of 8 active service and 4 substitute airplanes. The air forces are distributed as follows: 32 échelons in the Ukraina, 17 in the Moscow district, 9 in the Petersburg district, 5 in the Volga district. 784 flyers and 430 observers were liable to military service on July 1, 1924. The army administration has built 9 air fields near the European frontier since last spring and the air fleet union has built 30 air fields. The seaplane fleet consists of 12 échelons with 60 planes for the Baltic Sea, 100 for the Black Sea, and 20 for the far East; four new échelons are projected for the Caspian and the Pacific.

The air line Moscow-Charkow-Bakou-Tiflis will be opened on May 1; the fares will be the same as by railway. Transcaucasia and Georgia are shareholders to the amount of 300,000 rubles in the Ukrainian Air Traffic Co.

The Government contemplates sending an airplane squadron to visit Warsaw, Paris, and Rome, and another to Berlin and Paris.

Small motors of 100 to 160 horsepower for 3 to 4 passengers are being produced in great numbers in order to stimulate air traffic.

A military flying balloon that started from Petersburg under the direction of the chief of the military air school, Kyrilow, has disappeared. It is supposed to have been driven over northern Russia toward the pole.

Вооружение "Красной Горки" /Шхерного сектора Кронштадтской крепости/
Кронштадт
"Бухарин"
"Красноflотский"
Ижора
Ленинград
"Устье"
"Красноflотский" форт
Вооружение: 8-12" ор.
4-11" "
3-10" "
3-6" "
2-3" зенита.
Форт "Бухарина" /быв. "Переломной"/мысь "Сырая Лопедь"
Вооружение: 4 - 6" ор.
4 - 120 мм ор.
Батарея "Ижора" /быв. "Владимир"/ - мысь "Ижора"
Вооружение: 4 - 6" ор.
Батарея "Устье"
Вооружение - 4 - 6" ор.

Coast defenses of Leningrad

[Source M. I. D.]

The attached sketch, scale 1:200,000, prepared by the Latvian general staff, shows location and armament of the coast defences of Leningrad, comprising the fortress of Krasnaya Gorka (known also as the Izhorsk sector of the Kronstadt Fortress). The armament of the forts is shown (numbers refer to numbers on the sketch):

1. Krasnoflotski fort: Eight 12-inch guns, four 11-inch guns, three 10-inch guns, three 6-inch guns, two 3-inch guns, antiaircraft.

2. Fort Bouharin (formerly Peredovoy, on the Syraya Loshad Peninsula): Four 6-inch guns, four 120-millimeter guns.

3. Battery Izhora (formerly Vladimir, on the Izhora Peninsula): Four 6-inch guns.

4. Battery Ustje: Four 6-inch guns.

It is believed that the 12-inch guns are Oboukhovs and the 6-inch guns the ordinary Canet model.

OFFICE OF NAVAL INTELLIGENCE
NAVY DEPARTMENT
Washington, D. C.

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VOLUME IX—NUMBER 3

SEPTEMBER, 1926

DISTRIBUTION

In general: Bureaus of the Navy Department; all force commanders; all commanding officers of capital ships, the larger patrols, destroyers, and submarines

WASHINGTON
GOVERNMENT PRINTING OFFICE
1926

FOR CONVENIENCE IN ROUTING

Officer	Initials	Date received	Date forwarded
Captain			
Executive Officer			
Gunnery Officer			
Navigation Officer			
First Lieutenant			
Engineer Officer			
Asst. F. C. Officer			
Communication Officer			
Medical Officer			
Supply Officer			
First Division Officer			
Second Division Officer			
Third Division Officer			
Fourth Division Officer			
Fifth Division Officer			
Sixth Division Officer			
Marine Officer			
"V" Division Officer			
"A" Division Officer			
"B" Division Officer			
"E" Division Officer			
"M" Division Officer			
"N" Division Officer			
"R" Division Officer			
Radio Officer			

The material for the BULLETIN is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

NOTICE

The contents of this number of the BULLETIN are based upon information received in the Office of Naval Intelligence between July 25 and August 24, inclusive.

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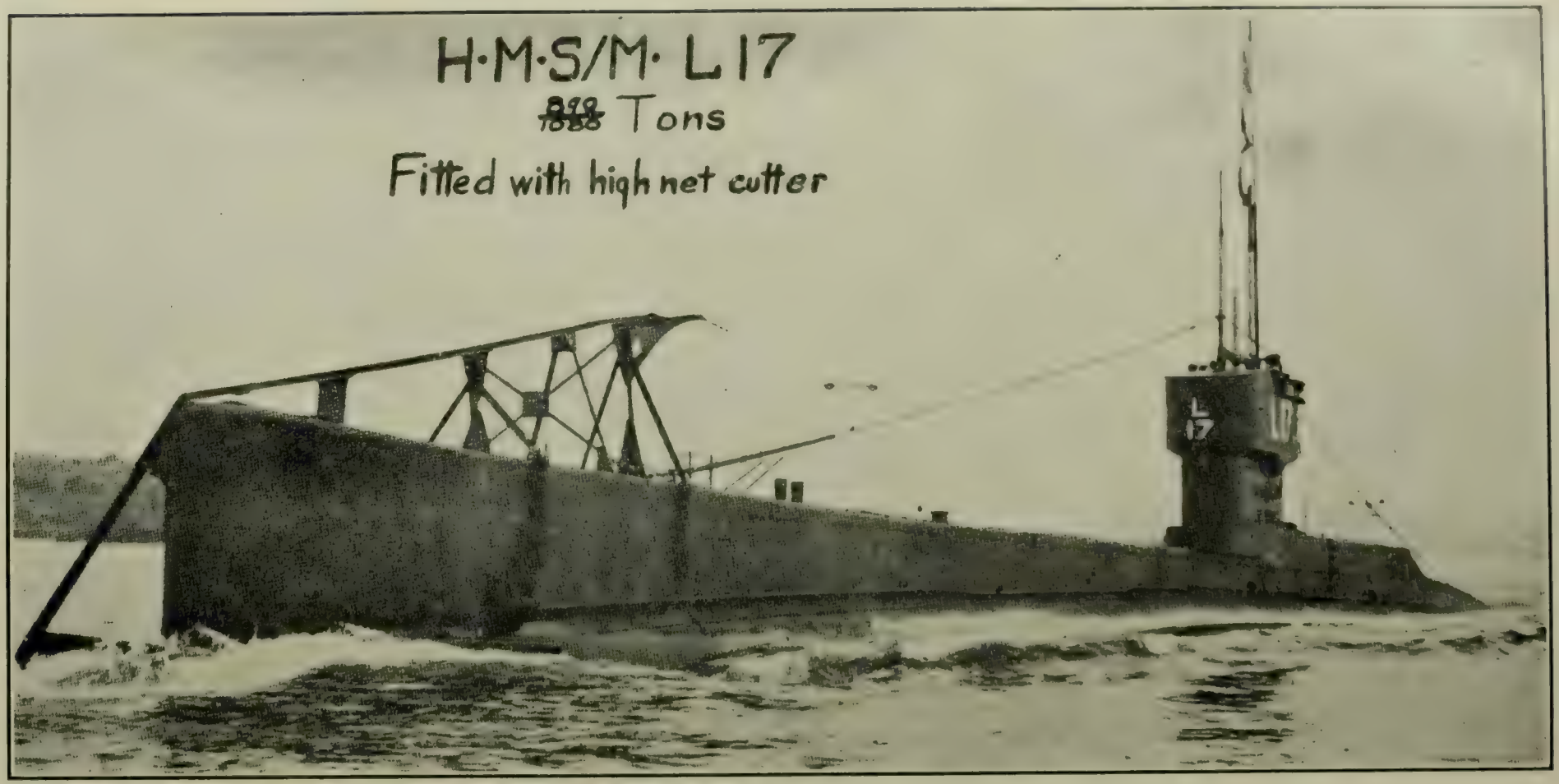
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Fitted with high net cutter
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17

CONFIDENTIAL

O. N. I. MONTHLY INFORMATION BULLETIN

VOL. IX SEPTEMBER, 1926 No. 3

ARGENTINA

A. NAVAL

1. Battleship "MORENO"

The battleship *Moreno* has arrived from the United States, and on June 30 anchored in Puerto Belgrano. On her arrival she was received and inspected by a representative from the Ministry of Marine representing the Minister, who is ill.

(NOTE.—The "Moreno," together with the "Rivadavia," has lately been undergoing modernization at Quincy, Mass. This work included new fire-control gear and alteration from coal to oil fuel.—Ed.)

BELGIUM

A. NAVAL

1. Abolishment of the navy

In the interest of economy the Belgium Defense Minister has decided to abolish the Belgium Navy. The vessels are all out of date, being mostly old craft left by the Germans, while their upkeep costs the State about 5,000,000 francs a year. The complete project of Belgium coast defense would cost about 350,000,000 francs, which is out of the question at the present time. The navy personnel will be available for army service. March 31, 1927, is the date set for the abolition of the navy.

The composition of the navy at present is:

Staff:
8 officers.
12 men.

(*a*) Personnel depot:
Staff—4 officers and 4 men.
Two training companies, each 4 officers and 110 men.
One depot and school company, 4 officers and 54 men.

(*b*) Coastal flotilla:
Staff, 4 officers and 4 men.
Five torpedo boats, 150 tons.
Five torpedo boats, 250 tons.
Torpedo boat personnel, 4 officers and 100 men.

(b) Coastal flotilla—Continued
One squadron of scout boats, 1 officer and 88 men.
Flotilla base and repair shop, 1 officer and 8 men.
(c) River flotilla:
3 officers.
150 men.
Total strength:
37 officers.
640 men.

CHILE

A. NAVAL

1. Naval strength

Following is translation of the law establishing the strength of the navy for the year 1926:

Art. 1. The National Navy will be composed during the year 1926 of the following ships:

Almirante Latorre, battleship (ex-British *Canada*, 1913, 28,000 tons, 10–14 in., 14–6 in.).
O'Higgins, cruiser (1897, 8,500 tons).
Chacabuco, cruiser (1898, 4,500 tons).
Blanco Encalada, cruiser (1893, 4,420 tons).
Captain Prat, old battleship (1890, 6,900 tons).
Esmeralda, cruiser (1896, 7,050 tons).
Ministro Zenteno, cruiser, 1896, 3,420 tons).
School ships:[1]
President Errazuriz, cruiser.
General Baquedano, gunboat (1898, 2,500 tons).
Lautaro, tender.
Destroyer leaders:
Almirante Lynch (1912, 1,430 tons, 31 knots).
Almirante Condell (1913, 1,430 tons, 31 knots).
Almirante Riveros (1913, 1,700 tons, 31 knots).
Almirante Williams (1911, 1,740 tons, 31 knots).
Almirante Uribe (1913, 1,700 tons, 31 knots).
Submarines: *H–1*, *H–2*, *H–3*, *H–4*, *H–5*, *H–6* (Fore River boats, 364/435 tons).
Transports: *Rancagua*, *Angamos*, and *Maipo*.
Tenders (light craft):

Leucoton,	*Aguila*,
Elicura,	*Pisagua*,
Orompello,	*Sibbald*,
Colo-Colo,	*Yelcho*,
Porvenir,	*Yanez*.

One old destroyer: *Guardiamarina Riquelme*, assigned to Torpedo School.
Airplanes: All that may be in condition for service; also such pontoons, tugboats, and the rest of such auxiliary ships necessary for the service.

---

[1] NOTE.—These school ships to be attached to School of Training of Enlisted Men.

Art. 2. The personnel of the navy for the year 1926 shall not exceed 10,675 men, distributed as follows:

Officers:	
Of the fleet, engineers, administration, sanitation, pilots, and of the reserve	625
Of the coast artillery	20
Total	645
Enlisted men:	
Enlisted men in class "white"	6,539
Enlisted men in class "blue"[2]	1,461
Conscripts of 2 years	535
Conscripts of 1 year	600
Total	9,135
Enlisted men, coast artillery corps:	
Regular enlisted men	555
Conscripts of 2 years	130
Conscripts of 1 years	200
Total	885
Grand total	10,665

In addition to the above, the following schools will function:

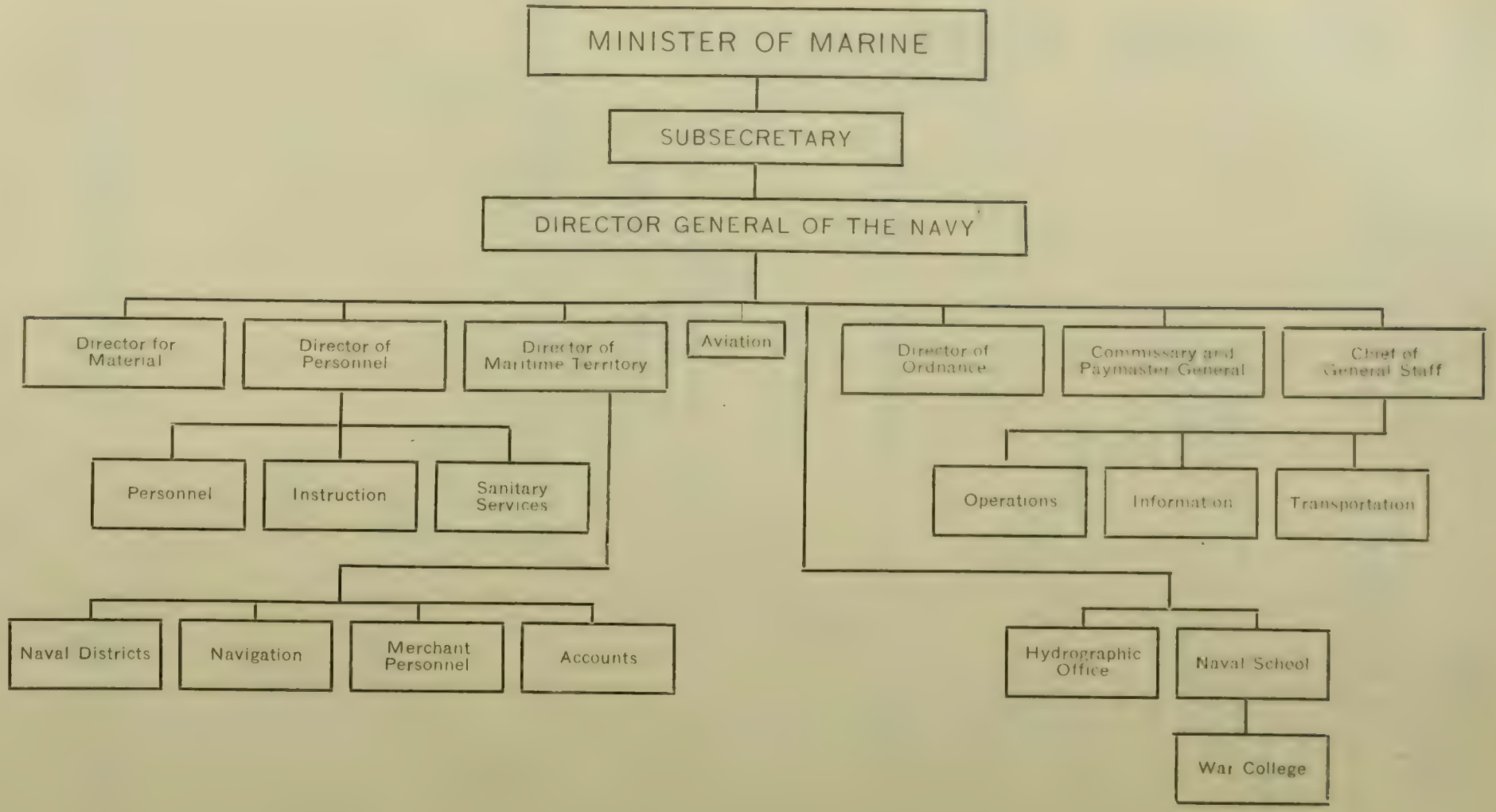
Naval Academy.
Naval College.
School of Engineers.
School of Pilots.
School of Mechanics.
School of Enlisted Men.
School of Torpedo Training (officers and enlisted men).
School of Artillery (officers and enlisted men).
School of Radiotelegraphy (officers and enlisted men).
School of Coast Artillery (officers and enlisted men).
School of Aviation (officers and enlisted men).

An inspection of the assignment of officers according to this list indicates that the following ships are on a more or less inactive status:

Capitan Prat (old battleship).
Errazuris (cruiser).
Uribe (destroyer leader).
Jarpa, *O'Brien*, *Thompson*, *Orella*, *Serrano*, *Camero* — Old destroyers.
H–3, *H–5*, *H–6* — Submarines.

[2] NOTE.—Enlisted men who serve in branches of the navy on land and at naval stations.

2. *Organization of Navy Department*



FINLAND

A. NAVAL

1. Building program

[Source: M. I. D.]

After three years of indecision and projects and counterprojects a naval program has finally been determined in general outline and cost, and part of the money involved appropriated for immediate construction. The vagaries of the program discussion have resulted from several conflicting factors, including:

(*a*) Entire lack of modern ships.

(*b*) Unwillingness of the Diet to provide the minimum protection recommended by the navy and by foreign experts.

(*c*) Recommendations of the Kirke commission (British) that relatively more weight be placed upon air force and coast defense artillery than upon a greatly expanded naval force. (General Kirke had long service in the garrison artillery.)

(*d*) Hostility to the recommendations of Commodore Von Schoultz (then commander of the navy, now resigned), because as an ex-Russian officer he was cordially disliked by Nationalist Finns and the groups in control of the Ministry of Defense. (With poetic justice, now that Von Schoultz is no longer in the service, the ideas of the program adopted closely parallel his recommendations.)

(*e*) Recommendations of the Hornborg commission (a mixed civilian and military commission), which placed more emphasis upon naval development than did the Kirke commission.

(*f*) Loss of the torpedo boat *S–2* last October, which made the Finns realize the utterly inadequate condition of their navy.

Program of construction—

	Finnish marks	(Dollars)[1]
(*a*) To be commenced in 1926:		
1 400-ton submarine 1 100-ton submarine	47,000,000	(1,175,000)
5 coastal motor boats[2]	10,000,000	(250,000)
(*b*) To be commenced in 1927:		
2 400-ton submarines	53,000,000	(1,325,000)
(*c*) To be commenced in 1928:		
2 armored gunboats	215,000,000	(5,375,000)
Total	315,000,000	(8,125,000)

(*a*) has been approved, and the money made available. Bids are now on hand from various countries for the submarines, and award of the contract is pending.

[1] 40 Finnish marks per dollar.

[2] The coastal motor boats are to be divided between the 1926 and 1927 allotments.

(*b*) has been approved in principle by the Diet, but final action has not yet been taken. The Ministry of Defense expects this will pass in October or November, 1926, with no reduction; and if so orders for the additional submarines will be placed shortly thereafter.

(*c*) is a project still awaiting action by the Diet. My own impression is that by the time it comes to a decision the appropriation may be postponed indefinitely, because of the large amount involved, and because enthusiasm for naval construction may then have waned.

The gist of the naval recommendations of the Hornborg commission is:

(*a*) The Minimum requirements for the navy are—

3 gunboats.
2 destroyers.
6 submarines.

The principal naval base to remain as Helsingfors and a secondary base to be established at Abo (opposite the Aland Islands, by the entrances to the Gulfs of Finland and Bothnia).

(*b*) Equipment of guns (including A. A. guns), mines, and mine fields, and the air service to be improved and modernized; coast artillery to be somewhat reduced.

(*c*) Construction during the period 1926/27–1933/34—

2 gunboats.
3 400-ton submarines.
1 100-ton submarine.
4 coastal motor boats.

(*d*) Construction desirable during the period 1933/34–1940/41—

1 gunboat.
3 400-ton submarines.
1 or 2 100-ton submarines.

---

2. *Details of construction*

[Source: M. I. D.]

SUBMARINES

(*a*) Proposals for two submarines (one 400-ton and one 100-ton) are in the hands of the Ministry of Defense, and award is pending. The principal firms competing (there are about 30 in all) are the Electric Boat Co. (through a licensee company, the Sandvikens Shipbuilding & Machinery Co., of Helsingfors); several British firms, including Vickers and Armstrong; Normand (France); several German firms; a Swedish firm; a Danish firm; and an Italian consortium.

The 400-ton boat desired is in general practicable, with certain exceptions noted below. The 100-ton boat is impracticable, and would appear to be rather a waste of money, if it is to be used as stated on Lake Ladoga. (The Finnish-Russian treaty provides that no warship of more than 100 tons shall be used by either nation on that lake.) A submarine on Ladoga can be little more than a gesture, and there is small probability of its being of any value except as a threat. (It has been humorously explained that the boat is desired because Finland has a flat car specially designed for transporting a submarine and wants to use it—one of the cars built for Russia for carrying submarines between the Baltic and Vladivostok during the World War.) The original intention was that this boat be used for coast defense where needed and not confined to Ladoga; this will probably be its eventual disposition.

(*b*) *Principal specification.*—

400-ton boat:
- Type—Double hull, for submersion to 75 m.
- Displacement—Surface, fully equipped, 350–400 tons.
- Speed—
  - Surface, 13.5–14 knots.
  - Submerged, 8–9 knots.
- Radius of action—
  - Surface, at 10 knots, 1,500 knots.
  - Submerged, at 4 knots, 75 knots.
- Diving speed—Submersion in 30 seconds.
- Emergence—From 9 meters to normal trim, 2 minutes.
- Armament—
  - 2 bow torpedo tubes, 53 cm.
  - 1 stern torpedo tube, 53 cm.
  - 1 75-m. A. A. gun.
  - 1 12.5-mm. machine gun.
  - 18–20 mines (200 kg. explosive charge).
- Equipment—
  - Diesel engines.
  - 2 periscopes, changeable magnifier (1 in conning tower).
  - 1 gyroscopic compass with 2 repeater compasses.
  - 1 magnetic compass with projector.
  - Radio apparatus for ½ kw.
  - Searchlight.
  - Submarine signaling apparatus.
  - To be specially strengthened for operations in ice.

Certain defects in these specifications have been pointed out by an expert:

The full complement of torpedoes (including reserve torpedoes) plus 18 mines is too much of a load. The E. B. Co. plans provide external detachable after mine ways, there not being room inside for both torpedoes and mines; but the submarine should even then be

used either as a mine layer or a torpedo boat, and not as both at full load.

100-ton boat:

Type—Single hull, for submersion to 75 m.
Displacement—Surface, fully equipped, 99 tons.
Speed—
Surface, 8–10 knots.
Submersion, 6 knots.
Radius of action—
Surface, at 8 knots, 500 knots.
Submerged, at 4 knots, 50 knots.
Diving speed—Submersion in 15 seconds.
Emergence—From 6 meters to normal trim, 2 minutes.
Armament
1 bow torpedo tube, 45 cm.
1 reserve torpedo.
1 12.5-mm. or 25-mm. machine gun.
8–12 mines (80 kg. explosive charge).
Equipment—
2 periscopes, changeable magnifier (1 in conning tower).
1 gyroscopic compass with 2 repeater compasses.
1 magnetic compass with projector.
Radio station for ½ kw.
Searchlight.
Submarine receiving apparatus.
To be specially strengthened for operation in ice.

Remarks as above regarding impracticability of combining mine-layer and torpedo use apply. The installation of a gyro compass would also appear to be impracticable, there being no clearance for the smallest type Sperry in even the 400-ton boat.

(*c*) Bids submitted are as follows (400-ton boats):

E. B. Co., 29,600,000 Finnish marks ($740,000, approximately).
French, 86,000 pounds sterling ($430,000, approximately).
British, 160,000 to 180,000 pounds sterling ($800,000 to $900,000, approximately).
Italian, 11,500,000 lire ($400,000, approximately).
German, 29,300,000 Finnish marks ($730,000, approximately).
Swedish, 29,500,000 Finnish marks ($740,000, approximately).

It seems at present that the principal competition lies between E. B. Co. and the Italians. If the former is awarded the contract, construction will be done at Helsingfors, in the Sandvikens yards, and Finnish labor employed. If the Germans get the work, construction will be done at the Crichton Vulcan Works, Abo. All other firms will construct in their home yards.

The original German bid was 31,000,000 Finnish marks, but was reduced to just below the E. B. Co. quotation after the German naval technical adviser of the Ministry of Defense (Captain Bartenboch, a submarine expert and during the war commander of

Zeebrugge) had seen the plans and reported the price. The Germans were thereupon permitted to revise their bid. The French will hardly be awarded the contract because of great dissatisfaction in Finland with a commercial ship turned out for a Finnish company last year. The Swedish bid is not acceptable because of the hostility of the strongly nationalistic government to anything Swedish. Under any bids but the American and German, under which construction is to be in Finland, there would be heavy additional expenses for keeping Finnish crews and constructors abroad during the work. If E. B. Co. has the contract, it means 7,000,000 Finnish marks in wages for the 400 or so men to be employed.

(*d*) Time of delivery will be between two and one-half and three years. E. B. Co. figures 27 months. E. B. Co. plans provide for four reserve torpedoes, two 400-horsepower Diesel motors (German type, made in Switzerland), a John Cockrill (Belgian) A. A. gun, and Zeiss periscopes; the boat to have a total crew of 22. All other plans give a much higher horsepower in the engines for the same speed, ranging between 1,100 and 1,300 horsepower.

(*e*) E. B. Co. quotation for the 100-ton boat is 8,000,000 Finnish marks ($200,000); but its construction is contingent upon having the contract for the 400-ton boat also. (No other quotation for the small boat available.)

(*f*) There is in Finland a large supply of old Russian Whitehead torpedoes, both 53 and 45 cm. No information available as to the exact condition of these except that the naval staff considers them satisfactory.

COASTAL MOTOR BOATS

To be built during 1926 and 1927, Thornycroft model, and will probably be awarded to Thornycroft.

Specifications.—

Length: 55 meters.
Armament: 2 torpedoes, and machine guns.
Speed: 40 knots.

This type of craft should be of very great value. Several more of these instead of the small submarine would be a much better investment.

GUNBOATS

These are designed to navigate in the shallow coastal waters and in the Gulf of Bothnia. Plans are not fully drawn, nor have proposals for their construction been made. They are a special problem in designing, because of the relatively very heavy armament.

Specifications.—

Displacement: About 4,000 tons.
Length: 90–100 meters.
Draft: 15½ feet.
Engines: Oil, developing 4,000 horsepower.
Speed: 15 knots.
Armament: Main batteries of four 9.2" (24-cm.) guns (two turrets, two guns per turret).

FRANCE

A. NAVAL

1. Naval fuel-oil stowage

(Official figures)

Total tonnage provided for and appropriated for:

	Tons
Crude-oil reservoirs	1,700,000
Gasoline reservoirs	165,000

To be completed at the rate per year of 105,000 tons of reservoirs for crude oil and 8,500 tons of reservoirs for gas oil.

Total tonnage completed as of April 1, 1926—146,000 tons crude and gas oil combined, located as follows:

	Tons
At Toulon	21,000
At Bizerte	112,000
At Dakar	2,000
At Cherbourg	7,000
At Brest	4,000
Total	146,000

(Notes on the above)

Status of construction at present time.—It is concluded that most of the total tonnage of 1,865,000 tons (1 above) is to be included in three large parks located respectively at:

(*a*) The region of Maison Blanche near Brest.
(*b*) Cherbourg.
(*c*) Toulon.

At Brest nothing has been done toward starting the large reserve park at Maison Blanche. Two new reservoirs of 10,000 tons each for current needs are to be commenced at an early date at Laninon. These are expected to be finished about the middle of 1927. Further, the Pétrolea Petroleum Co. has made a proposition to the Navy Department to build a large park in the Valley of

Moulin Blanc and rent part of their reservoirs to the navy. This has been accepted.

At Toulon nothing has been done toward starting the large reserve park. The contract for terracing, masonry work, metallic parts of reservoirs, pipe lines, and loading and unloading facilities for 90,000 tons of reservoirs at Lazaret for current needs has been let. It is expected that part of these reservoirs will be finished in 1927 and part in 1928.

At Cherbourg bids are out for the construction of 50,000 tons of subterrannean reservoirs for current needs, but it is not known at what date this work can be started. The preparatory work has not yet been done toward the construction of the large reserve parks.

NOTE.—As a matter of interest, in connection with the above, there is given below the best information available regarding the status of Italian naval oil-storage stations:

Station	*Capacity (in tons)*
Brindisi	*11,700*
Gaeta	*2,300*
Maddalena	*7,000*
Messina	*8,200*
Spezia	*233,300*
Taranto	*30,300*
Venice	*2,300*
Pola	*56,000*
Fiume (refinery storage for all oil products)	*156,700*
Total	*507,800*

—Ed.

B. AERONAUTICAL

1. Lack of modern military aircraft equipment

The recent debate in the Chamber of Deputies on the purchase of airplanes is of a nature to abolish many of the illusions regarding French military aviation which are cherished in certain quarters of foreign governments. It recalls at the same time some of the difficulties which other countries experienced before the war and which, in the present state of aeronautics, any power must find inevitable, even when it is prepared to spend money like water to achieve its end. The subject has been largely glossed over by the press, but the following information is derived from the available official documents.

On March 25 the rapporteur of the chamber committee, charged with inquiring into the methods adopted for the purchase of military machines, produced a report of 83 pages, which contains a number of remarkable, if not surprising, conclusions. In 1920 the credit

voted for machines and sheds alone was 100,000,000 francs. In 1924 it was 345,000,000; in 1925, 320,000,000. The total for the six years was about 1,350,000,000, of which 530,000,000 were for machines and 340,000,000 for engines.

What, asks the report, has the State had for its money? The answer is, that of the engines fit for use to-day only 13½ per cent are really new and 7.4 per cent, which are officially called modern, are really old ones to which improvements have been made. The rest were for the most part in existence in 1918 and resemble the traditional sailor's knife in the extent to which they have been repaired. Of machines many date from 1918. This is the case with two-thirds of the observation machines. The remaining one-third are new all-metal machines, which are an improvement on the old, but are not adequately armed. The day-bombing machines were originally intended for observation purposes and have serious defects as bombers. The fighters date from 1920, and can neither fly high enough nor fast enough to be able to cope with an enemy. The night bombers have so small a range that in Morocco it was necessary to use machines borrowed from the navy and fitted with British engines.

THE PURCHASE SYSTEM

In December last the Government ordered 50 Loiré-Olivier machines, a new type, without knowing how many men it could carry or how it would carry them and, moreover, without knowing the price. This machine, which was expected to cost twice as much as the type at present in use, could barely carry a bomb load of half a ton. No explanation had been forthcoming as to why this order was given. The only progress therefore had been in observation machines. The process of giving an order for a series of machines involves no fewer than 13 steps. Up to the end of last year no single bombing machine had the necessary bomb-dropping apparatus.

Constructors, the report complains, have a way of concentrating on the machines which pay them best. Only five firms, for instance, entered a competition contemplated in 1924, but only recently opened, for the big night bombers. The effect of orders given for a certain type of machine has been to check the production of a better type. Quantity takes precedence over quality to the detriment of national defense.

An interesting example is given of the problem of keeping engine constructors alive while hoping for the production of new and better engines. In March, 1924, an order was given for fifty 500-horsepower Salmson engines, as well as for ten 380-horsepower Jupiter, twenty-five 450-horsepower Hispano, sixteen 500-horsepower Pan-

hard, and sixteen 400-horsepower Farman. The following November the Minister of War wrote to the Undersecretary of State for Aeronautics (which is an undersecretariat of the Ministry of Public Works and arranges the purchase of aircraft for all services requiring them) that he learned that the Salmson firm was in such a difficult position that it could only be saved if it received a fresh order for 500-horsepower engines. He added: "It does not seem possible to justify such an order from the technical military point of view." Strange though it may appear, after stating further that, if he were correctly informed, the previous order had not been successful he went on to inquire, says the report, whether the firm should be helped again.

The Undersecretary of State for Aeronautics therefore recommended that another order should be given for as many Salmson engines as possible, and on February 2, 1925, another 50 were ordered, of a value of 5,500,000 francs, before the first 50 ordered a year previously had even been tried. A third order, also for 50 engines, was given last December.

DELAYS IN DELIVERIES

Considerable space is given in the report to the fancy prices charged for certain machines and engines and to the many months, and even years, delay in delivery without the infliction of any penalties. A striking feature is the frequency with which it seems that when engines have at length been delivered it has, for one reason or another, been quite uncertain whether it will ever be possible to use them.

The report concludes by inviting the Government to revise the regulations governing the relations between the Undersecretary of State for Aeronautics and the other departments with a view to closer cooperation and a fixing of responsibilities, to use Government factories as a means of controlling the constructors' charges, to institute proper tests for machines on delivery, to demand that the performances of machines manufactured in bulk should be up to sample, to avoid in future the abuses indicated, etc.

In the chamber the Undersecretary for State made a vigorous reply. He said that no power to-day had a larger assortment than had France of engines between 400 and 500 horsepower. He explained the importance of keeping alive as many good firms as possible and the familiar difficulties which may crop up during the manufacture of engines. Fresh difficulties which had arisen were connected with the progress of the adoption of all-metal machines. He mentioned that among machines now being tried was a 2,000-horsepower Farman, which carries over 1½ tons of bombs and a

half a ton of fuel, has a ceiling of 16,400 feet, and flies at an average speed of 115½ miles an hour. The number of machines delivered from 1900 to 1925 was 9,000 plus about 2,500 renewals. Ultimately the chamber, after dallying with the ideal of appointing a new committee to recommend improvements in the supply of material to the air services, accepted the conclusions of the report by 370 votes to 180.

GERMANY

A. MISCELLANEOUS

1. German military preparation

[Source: Extract of a report of a London information service]

Apropos of the answer that Sir Austen Chamberlain made recently in the House of Commons expressing dissatisfaction as to the disarmament of Germany, we have received through an important German source a summary of a series of charges that the German Socialist-Democratic Party is preparing to submit to the Reichstag in November when that body reassembles.

The German Socialist-Democratic Party is inaugurating a campaign against German militarism, and they expect to be able to prove the following:

(*a*) Not only can all civil aviation airplanes be transformed into fighting planes within three hours, but all essential spare parts required for this work are at present on hand.

(*b*) A contract, signed by the Minister of the Reichswehr with the Fokker Co., will be produced, which states that:

> In consideration for an order passed to this firm they undertake the obligation to be in a position to deliver, after one month's notice, 30 planes per day.

The total number of planes is not stated.

(*c*) In June a special secret committee, consisting of 10 German officers out of a total of 14 members, prepared a so-called "coordination of air services."

(*d*) The Badische Aniline Co. is conducting a great deal of research work in connection with a new gas. Professor Wasch has completed his studies for the production of this gas, which is both explosive and poisonous.

(*e*) Important industrial organizations have received secret instructions for the transformation of their factories within 48 hours for war purposes.

(*f*) Important orders have been placed for a new patented type of ammunition wagon for the transportation of gas shells.

(*g*) A secret treaty has been signed recently with Lithuania under which Germany agrees to help this country in her claim for sovereignty over the city of Vilna, provided Lithuania permits Germany to install factories for the production of war matériel.

NOTE.—*Vilna was seized by the Poles about two years ago, and since then the feeling of the Lithuanians against the Poles has been very bitter. German feeling against the Poles has been hostile since the creation of the Danzig Corridor and the allocation of upper Silesia to Poland. On account of these factors, paragraph (g) is not so preposterous as it might at first seem.—Ed*

GREAT BRITAIN

A. NAVAL

1. Progress of construction

The following gives the present anticipated dates of completion of H. M. ships under construction, shown in the navy estimates, 1926, as due to complete during the current financial year, viz:

H. M. S. *Nelson*, summer of 1927.
H. M. S. *Adventure*, end of 1926. (7,250-ton "cruiser mine layer.")
H. M. S. *Amazon*, H. M. S. *Ambuscade*: Autumn of 1926. (Destroyer, about 1,500 tons.)
H. M. S. *Oberon* (late submarine *O–1*), end of 1926. (1,480/1,750 tons; 23 more boats of this class to be built.)
H. M. S/M. *L–26*, September, 1926. (Last of the war-program boats.)
2 submarines building for Australia, spring of 1927. (Being built by Vickers (Ltd.); the first of these was recently launched.)

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2. Armor of the "Nelson" and the "County" class cruisers

It has been learned from an unofficial source, usually found reliable, that the horizontal deck protection of the *Nelson* contains, in some places, armor 6 inches thick and that the horizontal protection over the magazines of the *County* class cruisers is 4 inches thick.

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3. Distribution of battleships

[Source: English press]

The advent of the battleships *Nelson* and *Rodney* into the fleet is heralded by a series of appointments of specialist officers of all branches. It is understood that when complete these vessels will join the Mediterranean Fleet, from which the *Royal Oak* and *Resolution* will then be withdrawn. This transfer will not make any

advance in homogeniety of type in the Mediterranean Fleet Battle Squadron, for this force will then consist of four ships of 27,000 tons each, armed with eight 15-inch guns, and two of 35,000 tons, with nine 16-inch guns. The speed of the four *Queen Elizabeth* class ships is 25 knots, but that of the two *Nelsons* has not been made known. Press forecasts have credited the *Nelson* with speeds varying from 21 to 30 knots, but when one takes into consideration the displacement and other features of the design, it is probable that the real figure will be in the neighborhood of 23 to 24 knots.

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4. Disposition of old battleships

During the present financial year the following vessels of the Royal Navy will be removed from the effective list:

Ajax (1912, 23,000 tons; to be scrapped upon completion of *Nelson* and *Rodney*).

Thunderer (1911, 22,500 tons; to be scrapped upon completion of *Nelson* and *Rodney*).

King George V (1911, 23,000 tons; to be scrapped upon completion of *Nelson* and *Rodney*).

Agamemnon (1906, 16,500 tons, target ship; to be scrapped).

Submarine *L–19* (1919, 890–1,080 tons).

Radstock	Destroyers, war-time programs, 1915–1918, 900 to 1,100 tons, 35 to 36 knots.
Satyr	
Sorceress	
Sabrina	
Truculent	
Sikh	
Tarpon	
Sable	
Raider	
Retriever	
Red Gauntlet	
Telemachus	
Sharpshooter	
Stork	
Rapid	

The *Centurion*, sister ship of the *Ajax*, is to become target ship in place of the *Agamemnon*. Thus the *Iron Duke* class becomes the oldest class of battleship in the British Navy in combatant service.

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5. Destroyers "Amazon" and "Ambuscade"

The reported steam pressure of the *Amazon* and *Ambuscade* as 250 pounds, given by the Shipbuilding and Shipping Record, has now been found by a visit to Yarrow's shipyard to be incorrect, at least for the *Ambuscade*. The steam pressure is 300 pounds super-

heated to 700°. The contract shaft horsepower is 18,000 per shaft of two, or 36,000 shaft horsepower for 37 knots, contract speed. The builders are expected to show a considerable excess over these figures.

The H. P. turbine and L. P. turbine have phosphor-bronze blading except that the first stages of the H. P. turbine have monel blades on account of the high superheat, and the last few stages of the L. P. have stainless steel blades in order to secure structural strength.

NOTE.—The details of these boats have been rather meager, but that they will displace about 1,200 and 1,300 tons, respectively, and mount four 4.7-inch C. L. guns.—Ed.

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6. Long-range 24-inch torpedo under test

It is learned from usually reliable sources that the Admiralty have developed a long-range 24-inch torpedo which is now undergoing tests at Loch Long, and, it is intimated, they will be supplied to cruisers of the *County* class, probably in four triple tubes, two on a broadside, but with no spare torpedoes carried. It is understood that the Whitehead Torpedo Co. (Ltd.), Portland, England, is bidding for the manufacture to Admiralty design of these torpedoes for the *County* class cruisers.

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7. Submarine net cutters

The frontispiece shows H. M. submarine *L–17* fitted with a very high net cutter. It is understood the Admiralty are experimenting with net cutters for submarines, using *L–17* for this purpose.

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8. Singapore naval base

[Source: British press]

The announcement was made last week by the Colonial Secretary that the federated Malay States have offered a contribution of 2,000,000 sterling, to be paid in five annual installments, to assist the Imperial Government in proceeding expeditiously with the Singapore naval-base scheme.

The Government is acquiring for military purposes considerable stretches of the seacoast of Singapore Island and a portion of two islands situated in the eastern approach to the Johore Straits, where the sites for the new naval base and aerodrome are situated.

The work is proceeding satisfactorily on the new naval base. A labor force of 30 Europeans and 800 Indians and Chinese are engaged in reclaiming the swamp land and oiling and draining in order to eradicate the mosquitoes. There have been a few cases of malaria, but health conditions are generally good.

Six craft are proceeding with dredging operations, one of which is the largest in the world. Pile driving on the water front is progressing and roads and light railways are in process of construction.

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9. Docks and dockyards

[Source: British press]

The docks in the Pacific on British territory which will accommodate the cruisers (10,000 tons) now being built for the Royal Navy are two at Sydney, Sutherland Dock (Cockatoo Island), and Mort's New Graving Dock, Woolwich; one at Esquimalt, the new Dominion Government dry dock (practically complete); two at Hong Kong, the Taikoo Dockyard Co.'s dry dock and the Whampoa Co.'s No. 1 Dock; and one at Singapore, the King's Dock.

NOTE.—This does not include the docks projected or being built at Singapore.—Ed.

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10. Construction and repair costs

Items of finance relating to the construction and repair of H. M. ships are given in the comptroller and auditor general's report on dockyard expenses for the year ended March 31, 1925. The naval program for that year is shown to have involved an estimated outlay of £13,059,019 for direct charges, and £4,453,435 for establishment and incidental costs. The actual expenditure proved to be £50,664 above the estimate. Of the labor charges, 21.5 per cent was due to new construction and 78.4 per cent to repairs, etc., the latter percentage being higher than in previous years. The reconditioning of 284 gun mountings, which was ordered in the winter of 1924 for relieving unemployment, cost £51,850 more than the estimate, additional work being necessitated by the bad condition of the mountings, which had been exposed to the weather for two or three years through lack of space. The conversion of the cruisers *Effingham* and *Frobisher* from coal to oil fuel led to an increase in the expenditure on these ships. A further sum of £53,390 had to be spent on submarine *X 1*, "due to unsuccessful trials and to modifications to machinery being found necessary." Large sums were unexpended on the five cruisers of the *Suffolk* class, one reason being the delay in awarding the contract for 8-inch twin mountings. The

largest underestimate was in connection with the conversion of the *Furious* into an aircraft carrier, an excess expenditure of no less than £225,072 being incurred, partly as a result of the numerous modifications which were found to be necessary as the work proceeded.

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11. Destroyer attack on Dover

[Source: British press]

Destroyers belonging to the Nore Flotilla carried out a midnight attack on Dover, when all the seaward forts and searchlights were in action. The Sussex Artillery Territorial Brigade, who were in training at Dover, took part in manning the heavy guns.

The searchlights were illuminating the Channel from about 11 o'clock and numbers of people remained on the sea front watching them.

Heavy gunfire later declared the discovery of the attacking warships. Further attempts by the warships met with a similar reception, the searchlights making them good targets as they came into the radius. Searchlights and gun flashes made a picturesque scene in the darkness.

B. AERONAUTICAL

1. Royal Air Force display

On July 3, 1926, the Royal Air Force held its annual display at Hendon Aerodrome. The weather was excellent and the event was witnessed by approximately 150,000 spectators. The King and Queen of England and the King and Queen of Spain, with other notables, were in the royal inclosure.

The display was one of the most interesting and best all-around demonstration of aircraft that has been seen. Approximately 180 planes took part in the different events on the program. It was started at noon and continued until about 6.30 p. m. The display was very well staged and arranged, and the different events were carried out with precision and at the proper time, there being no delay whatsoever in the whole program.

The program of events and the impressions obtained during the carrying out of each event were as follows:

Event No. 1—Long-distance reliability trial.—This was a trial of approximately six and one-half hours' duration and open to night-bombing squadrons composed of eight airplanes each. The entries were three squadrons of Vickers *Virginias*, fitted with two 450-horsepower Napier Lion engines, and one squadron of Handley-Page

Hyderabad, fitted with 450-horsepower Napier Lion engines. The squadrons took off in formation, and the take-off was quite excellent, but the final close formation appeared to take some time, as there were generally one or two planes straggling. On the whole, for these heavy planes, it was quite a good demonstration. This event was won by the Handley-Page *Hyderabads*.

Four machines failed to complete the course.

Event No. 2—Message picking-up competition.—Three squadrons of the army cooperation entered, and a Bristol fighter with a Rolls-Royce 275-horsepower Falcon engine. This event was very well carried out, no trouble being had in picking up messages or in dropping the messages. The radiotelephone worked very well, and if you were close to one of the Marconiphone loud speakers you could hear the messages sent and received, but there was quite a bit of interference from the roar of the engines.

Lunch interval, 1 to 2.30 p. m.—From 1 to 2.30 p. m. during the lunch interval aerobatics were carried out by different type machines. This part of the program was quite interesting, but it could have been much more interesting if more aerobatics were performed. A great deal of the time was spent in planes obtaining great speed and pulling up into a very steep climb. This was very impressive, but tiresome.

The most interesting stunts pulled off during this time were done by a Sopwith *Snipe*, a single-seater fighter with rotary engine, and quite an old-type fighter. The *Snipe* would take off from the ground at about 30° angle, and when approximately 150 feet in the air make a very slow barrel roll of 360°.

The *Snipe* also flew on its back several times for a distance of approximately 1 mile. With the exception of the slow barrel roll of the Snipe on the take-off, the aerobatics displayed by the different machines was not very impressive, but there is no question that the pilots can perform any type of aerobatics that is known at the present time.

AFTERNOON EVENTS

Event No. 1—Group evolutions—Fighters—This event consisted of six fighting squadrons of nine planes each, four squadrons of *Grebes*, one of *Siskins*, and one of *Gamecocks*. Each squadron took off in close V formation and was almost at once in most excellent formation for flying. All of the V formations and line formations were flown directly over the airdrome and were equal to any formations of this type that have been seen. After flying over the airdrome the six squadrons broke up into two wings of three squadrons each and flew from opposite directions of the airdrome, one wing passing under the other wing at the center of the field. Al-

though this event was picturesque, it was very long and tedious. The landing of each squadron in close V formation was most excellently carried out.

Event No. 2—Air Ministry Race.—This was a handicap race of about 20 miles open to the different directorates of the Air Ministry. This event was of no interest whatsoever. It was finally won by the Hawker *Woodcock* fighter with a Bristol Jupiter six-engine of 425 horsepower.

Event No. 3—Parade of new and experimental types.—All the new experimental types were taxied by the spectators and then took off and flew around the airdrome. They were all in the air at the same time and flying in every direction. It was only due to the efficient flying of the pilots that accidents did not occur. The single-seater fighters, the *Gorcock*, the *Hornbill*, the *Firefly*, and the *Avenger*, caused considerable excitement, as did the day bombers, Fairey *Fox* and Hawker *Horsley*, and the night bomber, *Ava*, a new-type night bomber and coastal torpedo land plane. These airplanes were very instructive as to the advancement of British aviation during the last year and a half. The two planes which attracted the most attention, however, were the *Pterodactyl*, the tailless monoplane, and the Cierva autogyro.

The *Pterodactyl* obtained more applause than the autogyro. It was fitted with a 34-horsepower Bristol Cherub engine, and its demonstrations were most excellent. The pilot time and again attempted to stall his plane at about 300 feet altitude, but instead of falling into a spin the tailless monoplane would only settle slowly. The airplane appeared to handle very well and to land with practically no run. In fact, it landed and flew better than the much-advertised autogyro. The pilot flew the *Pterodactyl* in every way possible, except he did no acrobatics. It would dive toward the ground and make turns at about 25 to 50 feet from the ground, and clearly demonstrate that it was under control at all times.

The Cierva autogyro simply flew around the airdrome, but made no straight vertical descent. In landing it would land at an angle of approximately 30° to the horizontal, but would take very little run. It is understood that the reason no vertical descents were made was on account of the weak Avro landing gear and the possibility of it breaking, giving a bad impression of the autogyro.

Event No. 4—Low bombing.—In this event there was practically only a demonstration of fighters diving low to the attack in V formations of three planes. The main item of interest was the diving and turning of the planes in very close formations, and it was excellent and the flying of the pilots was extremely clever.

Event No. 5—Air maneuvers by radiotelephony.—The maneuvers of the fighting squadron carried out by radiotelephony were quite

impressive and well done. The orders could be heard through the Marconiphone loud speakers, but the noise of the engines spoiled the reception a great deal. However, this demonstration gave an excellent idea of the advancement of the British Air Force in the use of radiotelephony, and it is the first time that the writer has seen a squadron of fighters execute maneuvers by orders through radiotelephone.

Event No. 6—R. A. F. Reserve of officers' race.—This was a race of Bristol fighters of approximately 10 miles and was of no interest.

Event No. 7—Group evolutions—Day bombers.—This exhibition of evolutions by a group of two wings of two bombing squadrons of nine airplanes each was very well done, but tiresome.

Event No. 8—Attack by fighters and day bombers.—This event was well performed, and of great interest chiefly on account of the extremely dangerous and excellent flying it brought forth. It was a common occurrence to see three fighters diving from one side, and at the same time three fighters diving from the other side. The right-angle turns and very close formation were quite thrilling.

Event No. 9—Instructors' competition.—This event was not of much interest, although the stunts were well performed.

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2. *Report of casualties, Royal Air Force*

On July 28, 1926, Mr. Viant, in the House of Commons, asked the Secretary of State for Air the number of British airplanes which have been wrecked during the last year from June 30, 1925, to date; how many of these airplanes were new and how many were machines with reconditioned war-time engines; the estimated value of these machines; the number of men injured and the number of men killed during the same period; and how these casualties compare with those in the air forces of other countries.

Sir Samuel Hoare, Secretary of State for Air, replied as follows:

As regards the first two parts of the question, 70 airplanes of postwar design and 192 of war design were written off air force charge after crashing during the period June 30, 1925, to June 30, 1926.

As regards the third part, the undepreciated value of the machines involved in these crashes was roughly £500,000; the value of the parts salved can not be estimated without undue labor.

As regards the fourth part, the numbers of Royal Air Forse personnel killed and injured in flying accidents during the same period were 65 and 89, respectively. In addition, two army officers and two officers of the Royal Air Force Reserve were killed.

As regards the last part, these casualties compare favorably with those of other air forces.

The Secretary of State for Air later stated that there have been, between January 1, 1926, and July 27, 1926, 25 flying accidents, resulting in 44 deaths. He analyzed the accidents as follows:

	Home	India	Iraq	Egypt and Palestine	Mediterranean
(1) Error of judgment	8	3	2	4	2
(2) Weather	1			1	
(3) Aircraft defect	1				
(4) Cause not yet known or indeterminable		1	1	1	

3. Cost of English-built engines and planes

(*a*) The cost of planes, engines, and equipment, built in England is as follows:

Type	Plane	Engine	Equipment	Total
Combat	$11,178	$7,290	$972	$19,440
Bomb reconnaissance	16,767	10,206	1,215	28,188
Corps reconnaissance	6,075	6,804	1,215	14,094
Twin-engine night bomber	16,524	18,468	1,944	36,936
Heavy bomber	42,283	18,468	1,944	62,695
Torpedo		11,421		42,505

(*b*) Plane spare parts are usually ordered to approximately one-third the value of the contract for the plane concerned.

(*c*) The cost of the different type engines ordered in lots of 10 is:

Napier Lion, 450 horsepower	$11,421
Armstrong Siddeley air-cooled Jaguar, 384 horsepower	7,290
Armstrong Siddeley Lynx	4,374
Rolls Royce Eagle	4,762
Rolls Royce Falcon	6,415
Rolls Royce Condor, 650 horsepower	14,094
Air-cooled Bristol Jupiter VI, 450 horsepower	8,072
Bristol Lucifer	2,867

(*d*) The cost of the spare parts purchased with an engine is approximately 33⅓ per cent of the value of the engine.

(*e*) Total cost of complete plane, including installed engine or engines, is given in paragraph (*a*). The cost, including plane spare parts and engine spare parts, would be obtained by adding to the total cost as given in paragraph (*a*) one-third the value of the plane concerned plus one-third the value of the engine.

(*f*) Approximately one spare engine is purchased with each plane. It is not known for sure that this is true, and this question will be confirmed at first opportunity.

(*g*) About 33⅓ per cent (value) of engine spare parts are purchased with each spare engine. This question will also be verified.

(Rate of exchange used to obtain above figures $4.86=pound sterling.)

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7. Radiotelegraph—Radio installation at Croyden airdrome

The radio equipment used on the Imperial Airways is the Marconi 150-watt "all-purpose aircraft telegraph-telephone, type A. D. 6," and is the same as commercial radio equipment.

(*a*) The method of operating radio communications at Croyden is as follows:

When an airplane leaves any foreign station, a telegram is sent to the Air Ministry and the Air Ministry then telephones this information to the control station at Croyden, and when an airplane leaves Croyden a telegram is sent to the point of destination. The control station at Croyden keeps in constant touch with the airplanes leaving Croyden and those leaving foreign stations. The actual control of Croyden is only while the airplane is over England, but due to the lack of confidence with the French communication system Croyden keeps in touch with airplanes leaving Paris. The pilot in the airplane while over English territory reports every 20 minutes to Croyden and while over foreign territory Croyden always knows the location of the plane, and if a call from the English plane is not answered by the French service, both going and coming, Croyden directs operations.

Whenever an airplane wants a fix or bearing it calls Croyden, giving its call letter and simply asks for bearing. Croyden either gives its bearings from Croyden, or cross bearings from Pulham, Lympne, and Croyden according to the degree of accuracy necessary at the time. There is a direction-finding instrument at Lympne, Pulham, and Croyden, and immediately a pilot asks for bearings he is told to sound for one-half minute. All three bearings are then taken, reported to Croyden, and Croyden transmits to the airplane. It is stated that within one minute of the call from the plane cross bearings from these three stations can be given the pilot of the airplane.

At Croyden airdrome there is a telegraph station used in sending telegrams reporting planes leaving Croyden. All telegrams of airplanes leaving foreign stations for Croyden are sent by telegram to the Air Ministry, who telephones this information to the control station at Croyden. The control station is approximately in the center and on the right-hand side of the airdrome. The receiving station is 300 yards west of the control station and the transmitting station is located 150 yards north of the receiving station. At the present time the control is run from the control station, but the receiving station and control tower can both hear at

all times and receive from the airplanes. Whenever there is communication to be done, the receiving station switches the control tower onto the plane for transmission, but in case of necessity the receiving station can switch itself on. In case the control station can hear the airplane, but the receiving station has not thrown them in for transmission, the control tower by throwing on a switch attracts the attention of the receiving station, who then throws in the control tower.

This is the method in use at the present time, but upon completion of the new buildings of the airdrome, about one year from now, the control station and receiving station will be combined, i. e., the receiving station will be run in the control station by the control operators, thus cutting out the extra receiving station as used at present. Upon completion of the new airdrome it is contemplated moving the transmitting station approximately 5 miles from the control tower. The transmitting station is all automatic and the transmitting done by throwing in a switch from the present receiving station, which will later be done from the control tower.

(*b*) The types of transmitters and receivers combined are the Marconi. There are two transmitters, one of 1½ kilowatts and the other of 100 watts, called the emergency set; Morse or telephony can be used on either of the two, but at the present time telephony is always used. The operator in the receiving cabin by turning a switch can at any time use either without any assistance in the transmitting station. All starting, stopping, or switching is done at the receiving station. The direction finder is the Marconi-Bellini-Tosi direction-finding system and is patented and controlled by Marconi. Seventy-five per cent spares for transmitting and receiving sets are always kept on hand. An essential feature of the radio equipment at Croyden and in the airplanes is that they all belong to Marconi, who is responsible for the upkeep and efficient operation of same. Marconi maintains a staff of experts and repairmen for efficient operation of their radio equipment. The Imperial Airways pay for the use of them on an hourly flying basis and it is of great interest to the Marconi company to maintain their radio equipment in an excellent and efficient condition, as the Imperial Airways do not pay them for equipment when it is out of order. Thus if a plane's radio equipment does not work on the way from London to Paris, the Marconi Co. receive no payment for the use of the apparatus.

(*c*) In regard to the shielding of the ignition system of aircraft, this is accomplished as follows:

The manufacturer of the engine is responsible for the efficient shielding of the magneto leads of the engine. The aircraft manu-

facturer is entirely responsible for the bonding of the airplane. The efficiency of the shielding of the magneto leads and the bonding of the airplane is officially checked and passed by the aircraft inspection department of the Air Ministry when the plane has been delivered to the Imperial Airways. The Marconi Co. then take charge and are responsible to eliminate all further noises that may interfere with the efficient operation of the radio equipment. Experts from Marconi, after trying out the radio equipment, inform the Imperial Airways' experts of any further changes to be made, i. e., changes in bonding, changes in location of receivers or transmitters, or any further shielding of the magneto leads. It may be noted that the ignition system of the regular service airplanes is shielded in the same way as the commercial airplanes.

(*d*) The present radio communication between Croyden and airplanes is by telephony, using a wave length of 900 meters. There is no definite time set for the change from telephony to radiotelegraph, and it is understood that it probably will not be put into effect until the new airdrome is completed. It is then thought that they will probably use radiotelegraph for all airplanes over a capacity of 18 passengers, which can easily carry the extra load of a telegraph operator. It is thought that telephony will still be used for the other airplanes of lesser carrying capacity. The reasons for changing from telephony to telegraph are (1) it is considered more efficient, (2) the messages can be put through more accurately, and (3) there is less chance of interference. One reason for not changing from telephony to telegraphy is due to the difficulty of teaching pilots the Morse code and also due to the pilots being adverse to learning to be telegraph operators; also the fact that they can not afford to carry the dead weight of a telegraph operator when they are trying so hard to make commercial aviation pay its way. A 1,580-meter wave length is suggested as the proper wave length when and if they change from telephony to telegraphy.

(*e*) The radio aids to aerial navigation have already been discussed in (*a*).

(*f*) The Croyden control operators can communicate directly with the planes in France, but do not do so unless the pilot calls them or when listening in they find that the Paris operator at Le Bourget does not answer. It is accomplished directly from Croyden and not by remote control of a radio transmitting station on the coast. When the new airdrome is completed, it will be done by remote control from a transmitting station 5 miles from the Croyden airdrome.

5. Air activities at or near Southampton

[Source: Consular report]

There are five important airplane stations situated on the shores of Southampton water.

During June experiments were carried out at the Hamble airdrome of Messrs. A. V. Roe & Co. (Ltd.), with an autogyro airplane. The machine made four flights. It weighs 1,889 pounds and is propelled by a Clerget 130-horsepower engine. It is similar to the ordinary airplane except that most of the wings have been replaced by a windmill-shaped canopy over the pilot. When the machine is in flight, the windmill revolves at a speed of about 135 revolutions per minute. The machine can come steadily to earth at an angle of 45° or more and then flatten out and stop within a few yards of the point where it touches the ground. The inventor is Señor Vierva, a Spaniard. It is hoped to construct similar planes for commercial use at a cost of £440 for a two-seater, instead of £700 or £800 for the usual machine of its size and power. The machine was built to the order of the air ministry, for whom four other machines are in course of construction. It is stated that other nations have also placed orders.

The Supermarine Aviation Works (Ltd.) at Woolston carried out successful tests of their new *Swan*, the largest twin-engined amphibian flying boat to be designed and built in this country solely for passenger flights. The machine is fitted with two Napier Lion engines, each of 500 horsepower. It has accommodation for 10 passengers in addition to pilot and navigator and can also carry 700 pounds of baggage or mails. It was constructed to the order of the air ministry. Several others are being built. A large flying boat with three engines was launched at East Cowes from the works of S. E. Saunders. Further particulars are not available.

The Danish Government has contracted with the Supermarine Aviation Works (Ltd.) for a large three-engine flying boat to be used by the Royal Danish Naval Air Service. It will be fitted with three Jaguar air-cooled engines manufactured by Messrs. Armstrong Siddeley.

C. MISCELLANEOUS

1. Imperial Defense College

This unique institution is being organized for the training of a body of officers and civilian officials in the broadest aspects of im-

perial strategy. In this it seems to be a higher war college. The naval correspondent of the London Times writes as follows:

> Much is hoped from the work of the new college, although not as much as some enthusiasts would lead the country to expect. Lord Balfour, whose experience of the committee of imperial defense from its inception has been unique, wisely observed in the House of Lords on June 16 that he did not suppose that the result of the tuition which this new college, or any other institution, would give to ordinary human beings would turn out men equally competent to take command of the army, the fleet, or an air expedition. But it was all-important, he added, in these matters that soldiers, sailors, and airmen should as a matter of course understand something of what their colleagues in the other forces could and did do. The college may also be considered a necessary counterpart of the recent establishment of a collective responsibility for the three chiefs of staff of the fighting services, since it will train up a body of officers accustomed to think in three elements and to regard the problems of imperial defense as a whole.
>
> The first commandant will be Vice Admiral Sir H. W. Richmond, K. C. B. Since his return last autumn from being commander in chief in the East Indies, he has lectured at King's College on "Sea Warfare." He was, from 1920 to 1923, president of the R. N. War College at Greenwich, and had formerly been director of training and staff duties at the Admiralty. His war service afloat included the command of three ships in the Grand Fleet from 1915 to 1918, the *Commonwealth*, *Conqueror*, and *Erin*, and for a time he was liaison officer with the Italian Fleet.

GREECE

A. NAVAL

1. Ship notes

Work on the *Killkis* (ex *Mississippi*), which with her sister ship, the *Lemnos*, was being reboilered at Piraeus, has been completed, and that vessel will shortly leave for a foreign port not yet named for dry docking and painting. It is probably that the pupils of the Naval School will make their cruise in this ship on this trip.

The new mine layer *Paralos* has been completed at Rotterdam and has been delivered to the Greek Government. She will be assigned to duty at the arsenal. She is 400 tons displacement, 14 knots, and carries 52 mines.

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2. English naval mission

In the July BULLETIN in a M. I. D. report ("Activities of British Naval Mission") it was stated that the life of the British naval mission to Greece would probably not be a long one. Since that time the Greek Government has terminated the contract of the mission. The English Army, Navy, and Air Force Gazette comments as follows:

It seems inevitable that the efficiency of the Greek Navy must suffer from the wave of economy which is in full tide just now, and which has incidentally led to the termination of the contract of the British naval mission after one year instead of the two arranged for. It is not merely that the Greeks will save a paltry £9,000 or so by the withdrawal of the mission, but they evidently look for other savings by the abandonment or postponement of measures which the British mission was there to see carried out, notably the institution of a staff college and training along the lines recommended by Vice Admiral Sir Richard Webb. Whether the moment is not unpropitious for a retrenchment policy of this kind, when the Turks have begun to repair the *Goeben*, it is for the Greeks to decide. Admiral Townsend and his small staff have rendered them good service, maintaining the tradition set in this respect by Admiral Tufnell and others who have gone to Athens during the last 20 years, and if history teaches us anything it is that the Greek Government will be glad enough, when the financial situation is brighter, to ask the admiralty for the loan of other officers of similar tried capacity and knowledge.

NOTE.—Since the above news comment was printed the government of Pangalos, under whom the British naval mission contract was terminated, has been overthrown by General Condylis. This change may result in an alteration of the status of the contract.—Ed.

ITALY

A. NAVAL

1. Fleet maneuvers

[Source: M. I. D.]

[Reference: July BULLETIN, which gave an outline of the problem and the forces involved]

The Italian Navy maneuvers in the Tyrrhenian, which started June 22, at 8 p. m., ended June 23, in the afternoon, the red group having succeeded in discovering, attacking, and defeating the unit of the blue group (national) which, having sailed from La Spezia, was attempting to unite with the other unit stationed at Palermo.

In view of the fact that no press correspondents were invited on board to witness these maneuvers, details are totally lacking, and no official statement has been issued to the papers. It is understood, however, that the rôle of the air force was very limited and of secondary importance.

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2. New destroyers

[Source: Consular report]

The *Quintina Sella* returned to Naples from a "shakedown" cruise to the eastern Mediterranean on July 12, 1926. It is reported that the vessel performed very well in every respect and that only minor engineering difficulties were encountered. The last leg of the jour-

ney, from Sicily to Naples, was made on one engine because of the loosening of the propeller hub cap.

The oil-pipe line lagging was found unsatisfactory in that it is combustible.

The *Sella* will remain at Naples for approximately a fortnight for minor repairs and adjustments, following which it will hold designed speed and full-power trials and then proceed on a cruise to the Adriatic prior to joining the fleet in September.

The *Crispi* has completed her acceptance trials, and great satisfaction has been expressed at the performance of her "Belluzzo" turbines.

The *Ricasoli* and the *Nicotera* are outfitting in the arsenal at Naples.

The following is the translation of an article concerning the 16 new Italian destroyers which appeared in the Rivista Nautica Italia Navale of June 15, 1926:

With the month of July there will enter into service 4 of the 16 destroyers, which, with military necessity, intuition, and promptness of decision, the high marine hierarchies have desired to augment the strength of our war fleet.

The time has now passed in which every expenditure, every decision, every initiative in the field of the navy was, with demogogic thought which bordered on treachery to the security of the country, systematically obstructed and impeded.

At that time the military ministers, under the influence of the democracy dominating the Government, which lived in a continual fear of an unfavorable parliamentary majority, no longer interested themselves in technical questions which, in view of the continuous progress in the means of defense, came daily to the surface in the study of the problems regarding our armed forces; but it was their special interest to lose themselves in attempts to reduce expenditures, which efforts, if they were able to satisfy the deputies of that period, served to save the ministry and to carry out, with ever-increasing rapidity, the disorganization of our military organizations.

This is the truth, not new really, but which is well to repeat and to bring to mind. In comparison of the present with the past there will be given judgment with greater facility and more justice to the enormous work of reconstruction by the National Government. This is not a wasting of money on the part of the new administrators of the marine, but a judicious employment of capital which has its greatest and really immense return in the tranquillity which, from might, it gives to the nation: in the profound study of marine problems; in the search of perfection of technical details, and finally in the example which comes from other naval powers, all of which have guided the Ministry of Marine in ordering the construction of the new units.

Amongst the numerous decisions to be considered and taken for the reorganization of our navy, there was one which, more than the others, imposed itself and concentrated itself on an increase of our fleet adequate to future exigencies.

Naturally, in the field of military critics, two tendencies in this regard manifested themselves: One, emanating from the experts, that greater security and power were found in the large battle units, provided with most power-

ful equipment, capable of independence in operation; the other, instead, had its adherents amongst those who, given experience by the teachings of the recent war and by the acute examination of future possibilities, did not wish superships, but agile units, light, speedy, and, at the same time, provided with good offensive means.

This last tendency prevailed.

The sea must be plowed with high speed. The quicker the offense the more efficacious it is. And in speed there is also the greatest defense, for one may escape from an enemy lying in wait. Italian technique supplied the need admirably. From its study, from the ingenuity of the Latin mind, leaped out the types *Sauro*, *Sella*, and *Turbine*.

Theory, happily, had accomplished its task.

Practice must crown the work well begun.

The same technicians began to lay down in the national dockyards the chosen and perfected vessels, the torpedo boat destroyers.

After a relatively short time, because of the excellent preparation of the dockyards and the laborious activity of the builders, it was possible to launch the *Sella* and the other three boats of her class, the *Crispi*, the *Nicotera*, and the *Ricasoli*, which comprise the first series. These have three guns of 120 millimeters (4.7 inches), 45 calibers, four torpedo tubes, and one antiaircraft gun. In other respects they are the same as the boats of the second series.

The other 12 destroyers, of which the *Nazario Sauro*, launched on May 12 at Odero, is an example, will take the water, one by one, to form the homogeneous flotilla which in speed, armament, and independence are superior to all other flotillas of this class in our navy.

The destroyer *Nazario Sauro* is the first of the second series of the new boats.

Very sharp prow, flat poop, propellers widely projecting, it presents a very thin hull line.

Draft, M., 3.25; length, M., 90.20; beam, M., 9.20; displacement, 1,300 tons at full load; 35 knots; but the effective speed will be greater because it is more powerful than the *Sella*, belonging to the first series, which produced a greater speed than that anticipated. The engines are 34,000 horsepower.

The *Nazario Sauro* was designed and constructed in the Odero dockyard, where ultimately its twin, the *Cesare Battisti*, will be built, while the other two twins composing the squadron of the second series are found at "Quarnaro" of Fiume. These ships have two twin mounts of guns of 120 millimeters (4.7 inches), 45 calibers; two triple torpedo tubes of 533 millimeters (21 inches); and three antiaircraft rifles of 40 millimeters, situated one on the poop and the others nearly at the center of the ship at the base of the searchlight platform.

The four destroyers of the second series (*Battisti*, *Sauro*, *Manin*, and *Nullo*) were constructed from designs of the dockyard Odero, and more particularly by Engineer Eurico, who directed personally the launching of the *Nazario Sauro*.

In the dockyard Odero at Sestri Ponente, aside from the before-mentioned *Cesare Battisti*, which will be launched toward the end of July, there is under construction a destroyer of the third series, the *Turbine*, which series has 1 knot more speed than the others.

Belonging to the third series are also the destroyers *Aquilone*, which will be built by Odero, the *Borea*, the *Zeffro*, the *Espero*, the *Ostro*, laid down in the Ansaldo dockyard at Sestri Ponente, and the *Nembo* and the *Euro*, entrusted to Piaggio at Riva Trigoso.

3. *Gunboats withdrawn from Somaliland*

The royal vessel *Campania* and the gunboat *Toselli* have been recalled to Italy from the coast of Somaliland and Eritrea, where both had been on duty for the last 18 months. It is evident that general conditions in norther Somaliland have greatly improved, since the last military operations, and that the smuggling of arms must have ceased almost entirely. It is believed also that the posts along the coast and along the frontier with Etiopia and British Somaliland have been strengthened and well equipped to meet any ordinary uprising.

B. AERONAUTICS

1. *Air ministry*

The following diagrams show the new organization under the air ministry:

Diagram (a)

RELATIONSHIP BETWEEN AIR SERVICE, ARMY, AND NAVY

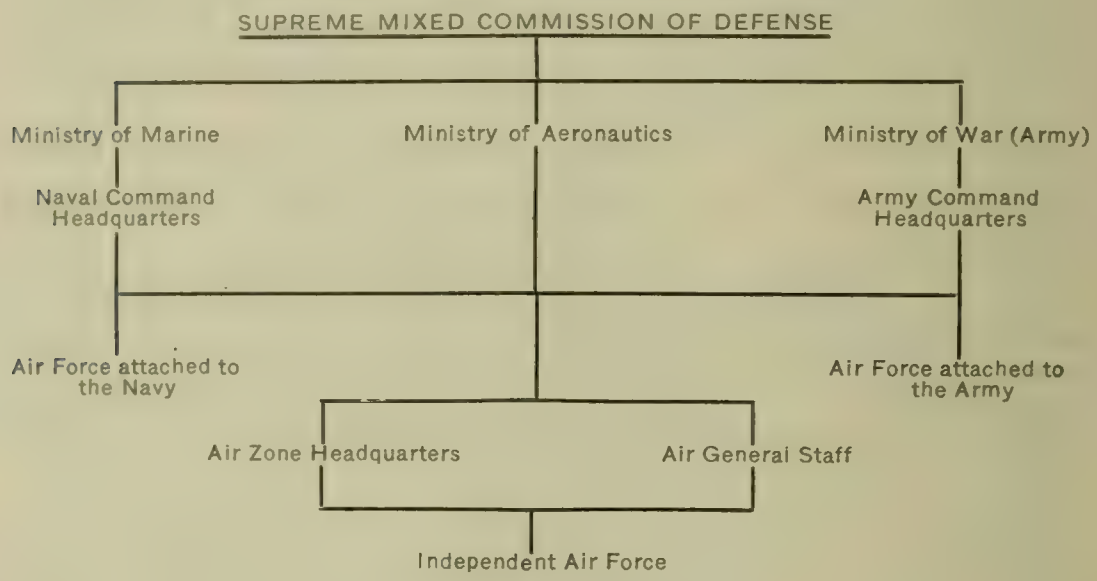
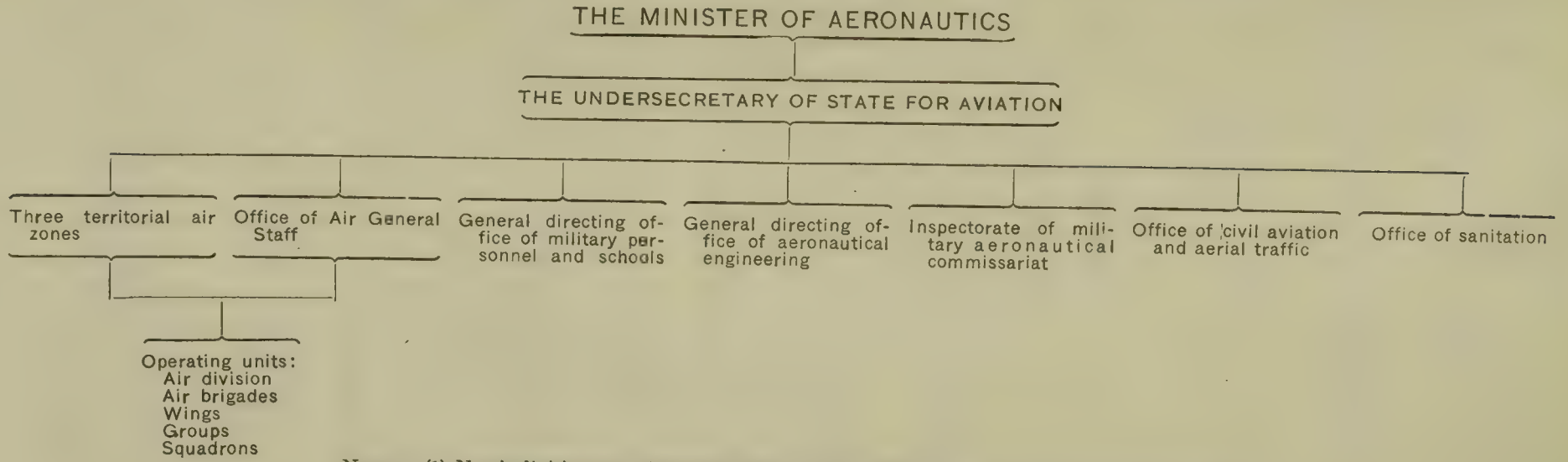


Diagram (b)

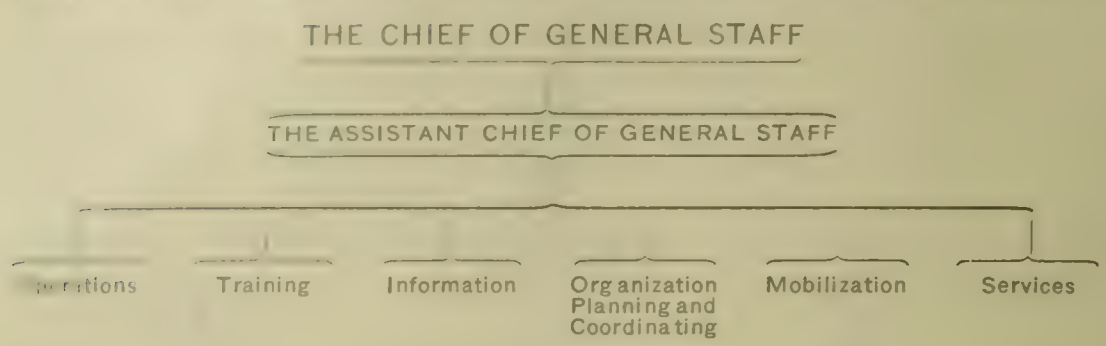
GENERAL ORGANIZATION OF ROYAL ITALIAN AIR SERVICE



NOTES.—(1) No air divisions nor air brigades have been organized as yet.
(2) The operating units (air divisions, air brigades, etc.) come under both the territorial air zones and the Office of General Staff. The air zone commands handle all administrative matters, and the General Staff supervises technical matters and general operations.

Diagram (c)

ORGANIZATION OF THE OFFICE OF AIR GENERAL STAFF



JAPAN

A. NAVAL

1. Aircraft carrier "Akagi"

According to the Japanese press, the airplane carrier *Akagi* is almost completed. Flying deck, and airplane hangars are completed, the wireless mast and the bridge, which are built on one side of the ship, are almost completed and a gyro stabilizer has already been installed.

The propellers of the *Akagi* will be changed, but as there are no docks at Kure large enough to hold her she will be sent to Yokosuka on September 15, 1926.

While en route from Kure to Yokosuka various trials will be conducted. She will sail to Yokosuka via Bungo Channel and various engineering trials will be held; experiments will also be conducted in flying, taking off, and flying on deck in the open sea. She will take on board at Kure between 60 and 70 airplanes.

NOTE.—The "Akagi," when fully equipped, will carry a total of close to 70 planes.—Ed.

2. Submarine "I–56" to be built at Kure

According to the Japanese press, orders for the construction of submarine *I–56* were given to the Kure Navy Yard on July 15, 1926.

NOTE.—This class is reported to be between 1,400 and 1,700 tons, b. h. p. of 6,000, a reported cruising radius of 16,000 miles, and a surface speed of 21 knots. Ten boats in the class, two completed, four launched, one building, and three laid down. See the July Bulletin for a detailed description of this class of fleet submarines.—Ed.

3. Submarine "RO–65"

According to the Japanese press, submarine *RO–65*, completed on June 30, 1926, will be assigned as training submarine to the submarine school at Kure.

The *RO–65* while proceeding from Kobe to Kure developed trouble with her rudder control and was forced to come to anchor while temporary repairs were made, after which she proceeded to Kure.

NOTE.—This class of nine boats displace about 1,000 tons on surface; surface speed about 16 knots. All but two are completed.—Ed.

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4. Destroyer "No. 17" torpedoed during torpedo practice

According to the Japanese press, during torpedo practice in the Bay of Hiroshima on July 13, destroyer *No. 17* was by mistake torpedoed at her stern by another destroyer. Her bottom and propellers were damaged, and she was at once docked at the Kure Navy Yard.

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5. Destroyer "No. 29" commissioned

Destroyer *No. 29*, built by the Fujinagato Dock Co., was completed and commissioned on July 4, 1926.

There have been assigned to her the following officers:

Duty	Rank
Commanding	Commander.
Gunnery	Lieutenant.
Torpedo	Do.
Navigator	Do.
Engineer	Lieutenant (engineering).
Ordered on board	Lieutenant (junior grade).
	Ensign.

NOTE.—This boat is evidently the last of the odd-numbered class to commission; 1,445 tons, 39,000 h. p., 34 knots, four 4.7-inch 45 cal. C. L. guns; six 21-inch torpedo tubes; complement 150.—Ed.

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6. Destroyer "No. 32" launched

Destroyer *No. 32*, under construction at Sasebo Navy Yard, was launched on July 12, 1926.

NOTE.—This is one of 27 boats authorized or on order. They displace 1,445 tons and are similar to "No. 29"; 15 completed, 29 projected, 4 launched, approximately 8 building.—Ed.

7. Oil tanks at Hiro

According to the Japanese press, the navy will shortly start construction on two 10,000-ton underground tanks in Takaya, reclaimed ground of Hiro. These tanks will cost 100,000 yen and will be completed by April, 1927. One more tank will be built at Hiro during the next fiscal year.

NOTE.—As stated in last month's Bulletin, these tanks are of an experimental nature; 3,000,000 yen have been appropriated for these and other experimental tanks.—Ed.

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8. Students to be admitted to naval schools for year 1926–27

The list below shows the number of students to be admitted to naval schools for the year 1926–27:

Name of school	Number of applicants	Number who passed physical examination	Number who passed professional examination	Number admitted
Naval Academy	2,105	1,139	481	130
Engeering School	551	346	171	50
Paymasters School	419	203	65	18

NOTE.—In connection with the above the following figures of our own Naval Academy may be of interest (year 1925):

Applicants (appointments)	*Number who passed professional examinations*	*Number who passed physical examination*	*Number admitted*
1,335	*592*	*405*	*405*

In the Japanese service there are no appointments such as in ours. All who apply, under such general limitations as age, character, etc., are eligible for the physical and professional examinations. The number to be admitted is determined by law, and these are chosen from those passing the physical and the highest professional examinations.—Ed.

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9. Naval estimates for the fiscal year 1927–28

According to the Japanese press, a conference was held in the Navy Department on July 9 regarding the funds to be asked by the Navy Department for the fiscal year 1927–28. The principal new items to be asked for are as follows:

	Yen	Dollars (1 yen= $0.40)
Maintenance of new ships	$14, 000, 000	5, 600, 000
Increase of 2½ air companies	3, 000, 000	1, 200, 000
Manufacture of deck airplanes	2, 000, 000	800, 000
Additional expense involved due to extension of course in naval schools (Naval Academy and Engineering School)	1, 000, 000	400, 000
Adoption of modern arms	22, 000, 000	8, 800, 000
Periodical repairs to ships	3, 000, 000	1, 200, 000
Increase in food and clothing expenditure	2, 000, 000	800, 000
Increase of pay and allowances, cadets, and petty officers	1, 000, 000	400, 000
For construction of additional heavy oil tanks	3, 000, 000	1, 200, 000
Renewal of submarine batteries	1, 000, 000	400, 000
For prospecting of oil fields in Formosa	500, 000	200, 000
For removal of naval offices and schools now in Tsukiji to other parts of the city	1, 000, 000	400, 000
For removal of Takinogawa (suburb of Tokyo) explosive factory to Kure	1, 000, 000	400, 000
Grand maneuvers	5, 000, 000	2, 000, 000
First year proportionment of the auxiliary ship replacement program	20, 000, 000	8, 000, 000
Research in chemical armaments, various aviation equipment, improvement, and extension of land radio stations, etc	3, 000, 000	1, 200, 000

NOTE.—*While these items are listed as "new," the following of the above appeared in the naval budget of 1926–27:*

	Yen	*Dollars (1 yen= $0.40)*	*Increase or decrease (dollars) of 1927–28 over 1926–27*
Adoption of modern arms	*1, 250, 000*	*500, 000*	*+8, 300, 000*
Periodical repairs to ships	*300, 000*	*120, 000*	*+1, 080, 000*
Renewal of submarine batteries	*500, 000*	*200, 000*	*+200, 000*

—Ed.

A later report on these estimates (1927–28) follows:

According to the Japanese press the Japanese Navy Department submitted the naval estimates for the fiscal year 1927–28 to the finance department on July 31, 1926.

The replacement-program estimates were submitted separate from the usual annual estimates and is a four-year program, the 1927–28 proportionment being 24,000,000 yen. The total amount of the estimates submitted for 1927–28 is about 300,000,000 yen ($120,000,000), of which the principal new items are as follows:

	Yen
Replacement program (1927–28 proportionment)	24, 000. 000
Maintenance of new ships	15, 000, 000
Increase of 1½ air companies (reduction of 1 company)	1, 800, 000
Maintenance of deck planes (the plan to place planes on all ships is held in abeyance and this amount covers the maintenance for only those planes already manufactured)	500, 000
Additional expense due to lengthening of course in naval schools	600, 000
Increase of pay and allowances	700, 000
Increase in food and clothing expenditure	2, 000, 000
Adoption of modern arms	5, 000, 000
Periodical repairs to ships	3, 000, 000
Renewal of submarine batteries	1, 000, 000
Grand maneuvers	5, 000, 000
Construction of additional heavy oil tanks	3, 000, 000

	Yen
For removal of Tobitagawa powder works to Kure (now in suburb of Tokyo)	700, 000
Prospecting oil fields in Formosa	1, 000, 000
For removal of naval offices and schools now in Tsukiji (Tokyo) to other parts of the city	1, 000, 000
Equipment of [illegible] radio stations, etc	700, 000

B. AERONAUTICAL

1. Loss of ship's balloons

According to the Japanese press, on July 6, 1926, while en route from Ise wan to Waka-no-ura, the mooring lines of the balloons moored to the *Nagato* and *Kitagami* snapped and both balloons were lost. There was no one in the balloons at the time.

2. Military landing field at Darien

[Source: Consular report]

There is given below certain information relating to a project of the Japanese War Department which, according to reliable sources, calls for the establishment of an airplane-landing field in the vicinity of Dairen, to be used exclusively for military purposes. Local press reports and conversations with well-informed individuals constitute the source of most of the available data on the project in question. The present description and discussion of the project will therefore be based largely upon these.

The site selected for the new landing field is located at Choushuitzu, a station on the South Manchuria Railway, 5½ miles northwest of Dairen, and the land to be utilized has already been purchased by the military authorities. The total area purchased amounts, according to information believed to be reliable, to approximately 870 acres, 250 of which is to be converted into a landing field and 620 acres to be held in reserve for possible future construction of auxiliary buildings. For the present, contrary to some reports, I have been informed that no construction of hangars on the site purchased is contemplated, owing to the lack of an appropriation for the purpose. There is also apparently no plan at present to attach any regular military units to the new flying base. The development of the project is not considered to have progressed far enough to warrant this.

Judging from information so far obtainable, there is little indication that the present project will early develop into a regular flying field, with hangars provided, and an air force attached. There is little doubt but that this would happen should an emergency arise

to justify it, but for the time being the main purpose of the new field is to give a landing place for planes which may come here from other parts of the Japanese Empire, particularly Heijo, Chosen (Korea). Under this main object it has been indicated that military considerations are of course included. By having a landing ground available, military planes from Heijo, Chosen, could be quickly despatched here for service in the event it became necessary, thus without having a local flying force a considerable measure of protection is believed to be afforded by the new project.

Construction of the new landing field, consisting chiefly of leveling the ground area which is to be prepared for the use of visiting airplanes, was recently begun, so that some indication of the significance attached locally to the project may be given. Some understanding of this is to be gained from the following editorial comment which appeared in a recent issue of the Manchuria Daily News:

"As matters stand," it was stated, "the leased territory is exposed to an aerial assault from any direction in its present defenseless state. The dispatch of an airplane from either Chosen (Korea) on Japan, no matter how quickly it might be effected, could not arrive quickly enough to be of any use; and, arriving here, would find no proper landing place." "It is for this reason," the article continues, "that a new air station in the neighborhood of Dairen is planned."

There is perhaps little doubt but that the above comment was inspired by recent civil and military disturbances in districts of China lying adjacent to the Kwantung leased territory. The recent military disturbances in Manchuria, in particular, during last winter were probably responsible in considerable degree for the decision of the Japanese military authorities to establish an airplane-landing field in the vicinity of Dairen. Viewed in the light of the events in question, such a decision seems a reasonable, and justifiable defense measure. The use of the station for purposes other than defense would of course place it in a different category.

C. MISCELLANEOUS

1. Japanese movement toward amendment of the Washington naval treaty

There is given below a translation of an article from the Tokyo Asahi Shimbun, stating that a group of persons in the House of Peers desired the Japanese Government to propose that part 3, section 1 (which states that capital-ship tonnage shall not be laid down until November 12, 1931), of the naval treaty be amended to permit

the construction of substitute capital ships after November 12, 1936, or, in other words, to extend the naval holiday from 10 to 15 years.

The attention of the Vice Minister for Foreign Affairs was drawn to this article. Mr. Debuchi said that Baron Sakamoto, the spokesman for the above-mentioned group, was a vice admiral, retired, and is a member of the Koseikai group in the House of Peers; that he was a man of varied interests who made a point of coming to see Baron Shidehara on all possible occasions. Mr. Debuchi added that the Government had given no consideration to the proposal and that such a serious question would of course never be lightly considered and that the matter need not be taken seriously.

The proposal did not draw much comment from the vernacular press. The Tokyo Nichi Nichi Shimbun, which has a wide circulation among the educated classes, stated on July 5 that the naval holiday prescribed in the naval treaty was soon to come to an end and that it was gratified to observe an influential group in the House of Peers advancing a suggestion for the extension of the holiday.

It may be remarked that the postponement by five years of a renewal of capital-ship competition would appear to be singularly convenient to Japan. The Japanese Navy desires to complete the auxiliary-ship replacement program by November 12, 1931, in order to clear its yards for the construction of replacement capital ships; while the treasury authorities have thus far insisted that the financial position of the Government during the next fiscal year will not permit the allotment of the large sums needed by the navy under its present projected program. In view of these conditions it would seem as though a protraction of the period in which the substantial sum of 297,000,000 yen could be expended would be of advantage to Japan.

[Tokyo, Asahi Shimbun, July 1, 1926]

A group of persons in the House of Peers with naval antecedents, led by Baron Sakamoto, have initiated proposals for the amendment of the provision in the naval treaty with respect to the construction of substitute ships, one of the most important provisions in regard to limitation of naval construction concluded at the Washington Conference. They are now considering the most effective method of suggesting to the Government that it propose, when suitable opportunity offers, to the Governments of Great Britain, United States, France, and Italy that a conference be held either in Washington or in Tokyo to discuss this proposed amendment.

The amendment is to consist of changing in part 3, section 1, the phrase "no capital-ship tonnage * * * shall be laid down until 10 years from November 12, 1921" to "no capital-ship tonnage shall be laid down until 15 years from November 12, 1921."

Baron Sakamoto says:

It is unnecessary to say that the slogan of "limitation of naval armament" is intended to reduce the burden of naval expenditures and to promote the happiness of mankind; and this, indeed, is our motive in announcing our opinion that the naval treaty concluded at the Washington Conference should be amended. We contend that the 10 years' naval holiday should be increased to 15 years; the present ratio will merely be maintained for an additional 5 years; therefore there is logically no reason why any country should object to the proposal. If the amendment is accepted, Japan would not only take its place as a leader in the work for international peace, but the economic burden on the people would be lessened with an accompanying increase in the national strength.

MEXICO

A. NAVAL

1. Construction program

[Source: Consular report]

Notice has been received that the Government has signed contracts with a German firm, Schichau de Elbring, for the construction of various vessels to be delivered during the next year. A shipyard will be built for the construction of the 10 coastwise and 10 armed launches to be added to the Mexican Navy.

The armed launches will have a speed of 20 knots, Diesel motors, carrying three guns of 57 millimeters each, and rapid-fire guns of 7 millimeters. The coastwise vessels will be 270 tons, armed with 75-millimeter guns. There is also included in the Mexican naval program for the year 1927 the construction of 10 hydroplanes with 360-horsepower motors. The hydroplanes will be used by the marine commanders in the different Mexican ports. The shipyard to be built will cost 3,000,000 pesos ($1,500,000), capacity 1,500 tons, and will probably be at Tampico.

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2. Visit of the "Rochester" to Vera Cruz

[Source: Consular report]

During the stay of the U. S. S. *Rochester* at this port, from July 13 to July 20, 1926, only praise was heard from the local Mexican officials and residents of Vera Cruz as to the splendid conduct of the crew while on shore leave.

At first there was a slight feeling among some of the port and municipal officials that the visit of the U. S. S. *Rochester* was not as stated, a friendly one. A few minutes after they had been re-

served on board, a change was noticed; all doubts were removed as to the nature of the visit.

All attentions and courtesies possible were extended by the Federal, State, and municipal authorities. The captain of the port, Rafael M. Canals, instructed the doctor in charge of the Mexican Health Department to give all courtesies and make his inspection of the vessel as brief as possible.

Commodore Antonio Ortega y Median of the Mexican Navy, stated he would like to have this consulate inform the proper authorities in the United States that the port of Vera Cruz would like to have more frequent friendly visits from ships of the American Navy, especially those like the *Rochester*.

Unquestionably the visit of the U. S. S. *Rochester* accomplished more than was expected, and this friendly visit was a success in every way. It built up a more solid foundation for better relations between the Vera Cruzanos and the American people.

LATVIA

A. NAVAL

1. Submarine construction

[Source: M. I. D.]

The first of the two Latvian submarines being constructed in France, the *Ronis*, was successfully launched at Nantes on July 1.

Dimensions (varying slightly from those given in report 4547):
- Displacement, about 400 tons.
- Length, 55 meters.
- Beam, 4.6 meters.

Motors:
- Oil.—2 Diesel-Sulzer-Loire, 650 horsepower each (constructed at the Chantiers de la Loire, at Saint-Denis).
- Electric.—2 of 350 horsepower each.

Speed:
- Surface, 14 knots.
- Submerged, little over 9 knots.

Radius of action:
- Surface, 1,600 sea miles.
- Submerged, 85 sea miles.

Diving: To 30 meters.

Periscopes: 2, for use submerged up to 11 meters.

Armament:
- 6 torpedo tubes, 450 millimeters; of these 2 are fixed.
- 1 76-millimeter A. A. gun.
- 2 machine guns.

Crew:

3 officers.

28 men.

Constructed by Ateliers et Chantiers de la Loire.

NOTE.—In connection with this report and that on Finland it may be of interest to note that no less than 31 submarines are projected or under construction for States bordering on the Baltic Sea. These are: Poland, 12; Russia, 10; Finland, 4; Denmark, 2; Latvia, 2; Sweden, 1. The majority of these are under 400 tons' surface displacement.—Ed.

NETHERLANDS

A. NAVAL

1. Light cruiser "Sumatra"

The *Sumatra* was inspected on July 16, 1926. This vessel was lying at a private dock at Amsterdam and is in the process of receiving the finishing touches before leaving for the Dutch East Indies early in September.

There is practically no difference between this ship and the *Java* except the propelling machinery. The *Sumatra* is fitted with turbine reduction gear. The ship was originally designed for direct-drive turbines, and when the original set of engines was destroyed by fire it was decided to install a design fitted with reduction gear. No additional space was allocated and consequently the engine rooms are very crowded and any overhaul must be accomplished under great difficulties. The two forward engine rooms are separated with a water-tight bulkhead. This bulkhead is pierced with a communicating water-tight door; also a port about 10 inches in diameter has been cut in this bulkhead.

In addition to the steam steering gear there is installed an electric steering engine which is used for speeds up to 16 knots. This is installed in order to reduce the heat at ordinary cruising speeds.

The magazine arrangement is the same as in the *Java*. The writer was impressed with the size of the magazines and the absence of bulkheads. All bins and flooring are of wood.

The installation of the battery is similar to that on the *Java*. The naval attaché was informed by the captain that the fire control was a Dutch installation, a combination of British and German design. Most of the instruments were made at the Zeiss plant at Venlo.

The bridge is small and cramped. The conning tower is installed abaft the bridge and has a poor view.

As yet no fire control system has been installed for the antiaircraft guns, and it was gathered from statements by the captain that no scheme has yet been worked out. The Berkoz instrument has not been developed for use on board ship.

The officers' quarters are aft, and being close to the propellers will probably not prove comfortable. The spaces amidship and outboard on the main deck have been fitted for the "native" petty officers. These spaces could have been used advantageously for officers' quarters.

The living spaces for the crew are forward, and from statements made by the captain the crew are very crowded in their quarters. It is necessary to have two tiers of hammocks on each deck. Many passageways could be conveniently used for berthing space and some of the crowding avoided.

There is an auxiliary Diesel engine of about 340 horsepower installed for port uses, thus permitting the extinguishing of fires in the main boilers in port.

Dutch officers still seem to be suspicious of electric installation and prefer steam installation where possible.

It is estimated that the economic speed is about 10 knots.

The forward antiaircraft guns are hampered by ship construction, stays, etc., which limit the area of fire.

One master gyro is installed, with the usual repeaters.

The ship is fitted to carry two airplanes, one on either side of the upper deck amidships. There is a crane on either side for hoisting in and out. It is not the intention to carry the planes on the cruise to the East Indies, but to take them on board after arrival there.

The ventilation is the exhaust and supply system, the power being supplied by electric motors and it appears adequate.

The official trials were completed May 8, 1926. On a 6-hour speed run the vessel maintained 31.8 miles and developed 83,000 horsepower. On the durability test of 30 hours she maintained 12 knots on about 23,000 horsepower.

NOTE.—The "Sumatra" and the "Java" displace 7,000 tons; designed speeds, 30 knots; mount ten 5.9 50-caliber guns (7 on a broadside); carry 12 mines and no torpedo tubes.—Ed.

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2. *The cruise of the "Sumatra"*

H. M. S. *Sumatra*, under the command of Capt. G. L. Schorer, expects to sail from Amsterdam about September 20, 1926, for the Dutch East Indies.

It is contemplated to dock the *Sumatra* at San Francisco.

The following is the proposed itinerary of H. M. S. *Sumatra:*

Port	Arrive	Depart	Port	Arrive	Depart
Ijmuiden		Sept. 21	Balboa	Nov. 30	Dec. 2
New York	Oct. 6	Oct. 14	San Francisco	Dec. 16	Dec. 23
Habana	Oct. 19	Oct. 25	Honolulu	Jan. 1	Jan. 6
Tampico	Oct. 29	Nov. 3	Yokohama	Jan. 21	Jan. 31
Curacao	Nov. 11	Nov. 22	Shanghai	Feb. 4	Feb. 11
La Guayra	Nov. 23	Nov. 27	Batavia	Feb. 21	

3. *Submarine "K–XIII"*

The submarine *K-XIII*, Royal Dutch Navy, arrived at the submarine base, Coco Solo, on July 24, 1926, from Curaco, Dutch West Indies, for Dutch submarine base in Java, Dutch East Indies.

The vessel was commanded by Lieut. Commander L. G. L. Van Der Kun, an officer of 10 years' submarine experience. He gave the impression of being a thoroughly capable officer, quiet, gentlemanly, courteous, but holding himself very much aloof from his subordinates.

The other officers were as follows:

Senior Officer J. L. Wellinge.

Lieut. (Third class) M. J. Wytenea. (This officer has had only slight submarine experience.)

Engineer Officer (First Class) C. Van der Linde. (This officer has had three years' submarine engineering experience and is very capable.)

Engineer Officer (Third Class) J. Van Sandwiyke.

All officers and many of the crew spoke English.

The engineer officers perform engineering duty only and act as the boat's diving officer.

The *K-XIII* is a strongly constructed boat built by German workmen in Holland and is in regard to hull features similar to the German submarines. The boat displaces 750 tons on surface, has 20-foot beam, and about 200 feet long. The deck is water-tight, fitted with free flooding and vent control. All fittings on deck are easily demountable, giving the least possible underwater resistance. The gun mounted just forward of the bridge is of the wet type mount entirely inclosed in stream lines. Gun is of 8.8 c. m. and may be used for high-angle or horizontal fire. Length of gun is about 40 calibers.

The bridge is comfortable, but undoubtedly much wetter in rough weather than the type bridge installed on S-boats. No loop antenna; one wireless mast and two excellent periscopes protrude from conning-tower shears aft of the bridge. The torpedo room forward is fitted with four tubes, two upper using 18-inch torpedoes

and two lower 21-inch torpedoes for long shots. All torpedoes were Whitehead type.

The chief petty officers' living compartment and the ship's galley are situated in the forward torpedo room. Van Der Kun stated that the ventilation was good in the torpedo room when cruising in rough weather.

In forward battery room is situated the commanding officers and ship's officers' quarters. They have by far the largest and most comfortable space in the boat.

The central control room is very crowded, and many of the fittings are apparently most inaccessible. The control while submerged is normally from the conning tower, but can be shifted to the C. O. C.

The periscopes are manufactured by Goertz, very clean and clear. The periscopes are tapered to about 2 inches in diameter at the top. A Sonic depth finder is located in the C. O. C., but was told by Doctor Mienesz (the scientist on board) that it was not accurate.

After battery room was used as sleeping, living, and messing compartment for crew.

Engine room.—In this room are two 1,200–1,000 horsepower M. A. N. reversible engines, six cylinders, which I was informed would at full speed give a surface speed of 17 knots. The normal cruising speed of this vessel is 7 to 8 knots, one engine. The engineer officer, Van der Linde, was greatly pleased with the operation dependability of these engines, no engine casualty having occurred during the trip from Holland.

Main engine clutches are air operated.

Motor room.—The main motors, of approximately 300 horsepower, were practically concealed under the floor plates, as were most of the engine and motor room auxiliaries. This feature made them somewhat inaccessible and would add greatly to the time necessary for repairs.

Motor control is more complicated than that of an S boat.

The motor room contains two 18-inch torpedo tubes for stern shots, with a special loading device for these tubes.

Safety features.—Bow buoyancy tank and five water-tight compartments in superstructure. Main ballast tanks may be blown from forward torpedo room, C. O. C., and motor room. A buoy containing a telephone and cable is rigged in superstructure, which can be released from interior of boat.

General.—Forward planes are rigged out permanently similar to *S–48* type, but very rugged. These planes are evidently most satisfactory.

All internal fittings were well made and finished.

All ballast pumps are of the centrifugal type and take suction from the duct keel, as in our *S–20* type boats.

All Kingstons and vents may be operated simultaneously by two valve handles.

Battery.—The battery of the *K–XIII* consists of 132 cells, each cell having 31 plates; specific gravity of electrolyte, 12.20; voltage, 315. The battery is of German construction.

The crew consisted of 5 officers, 6 chief petty officers, and 20 men. All enlisted ratings were picked men.

Enlisted men of crew received extra compensation for submerged work at rate of 50 cents per hour and officers at the rate of $2.50 per hour.

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4. Submarine "K–XII"

The submarine *K–XII* expects to leave for the Dutch East Indies via the Suez Canal about the middle of September.

NOTE.—"K–XII" is a sister ship of the "K–XIII," described above. There is one other in this class, the "K–XI."—Ed.

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5. Ventilating cooling system installed on Dutch submarines

The ventilating cooling system installed on the Dutch submarines on duty in the East Indies was furnished by the J. & E. Hall Co. (Ltd.), London.

The following is a description of the machinery:

The cooling set is driven by a 12-horsepower shunt motor (800 revolutions per minute, 242/355 volts) with chain connection (196 revolutions per minute.)

Dimensions of cooling machine: Height, 1.50 meters; breadth, 0.66 meter.

Weight of the installation with motor, condenser, foundation, and cooling tank: About 4,500 kilograms.

Dimensions of cooling tank: Height, 0.78 meter; breadth, 0.54 meter; length, 3.12 meters.

Capacity: If temperature cooling water (sea temperature) is 78° F., 37 M^3 dry air per minute can be cooled from 91° F. to 45° F.

The results obtained with this system on submarines assigned to duty in the East Indies have been very satisfactory with regard to cooling the batteries and drying the air. It is understood from an unofficial source that this ventilation system is not used for cooling the atmosphere but for absorbing the moisture from the air while submerged.

B. MISCELLANEOUS

1. Rejection of oil concession in Dutch East Indies to the Netherlands Colonial Petroleum Co.

At a recent meeting of the people's council (Volksraad) in Batavia the agreement to authorize an oil concession to the Netherlands Colonial Petroleum Co. (Standard Oil Co.) was rejected. At the same meeting the bill authorizing a concession to the Royal Dutch (British-Dutch capital) was approved.

The concession under consideration for the Netherlands Colonial Petroleum Co. consisted of about 625,000 acres on the islands of Java, Sumatra, and Madura.

The concession for the Royal Dutch consists of extensive acreage on the island of Tarakan, near Borneo. The oil obtained on this island is similar to that obtained in Borneo—that is, heavy fuel oil.

The action of the people's council is not final, but only advisory to the Colonial Government, which can bring the question before the States-General. While no reasons have yet been received for the rejection of this concession, the Colonial Department believes that the people's council objected to the draft because it did not provide for mixed management (that is, Government participation in the management of all projects for further development of the oil resources in the Indies).

The *Handelsblad* makes the following comments on the action of the Volksraad:

> The decision of the Volksraad will presumably attract much attention abroad. Probably it will also come as a surprise to the directorate of the Royal Dutch. In the latest annual report of that company the following was said regarding this matter:
>
> "It is not for us who favor an open-door policy in petroleum matters to criticize the prospects thus opened to a subsidiary of one of the Standard Oil companies, though in refraining from doing so we run the risk of creating the false impression that, having a part interest in the Nederlandsch-Indisch Aardolie Mij (Djambi concern), we (who have not been allotted anything) have no reasons to complain.
>
> "We hope, however, that these measures will remove once for all the idea sometimes entertained in America that Holland and its colonies are not prepared to give practical effect to an open-door policy."

This, of course, was published before the action of the Volksraad.

This action greatly benefits the Royal Dutch and deprives the Netherlands Colonial Petroleum Co. of large acreage for prospecting, and, furthermore, delays the opening up of this country for development.

PERU

A. NAVAL

1. Submarine construction

[Source: Consular report]

On July 13 the press announced that the second unit of Peru's new submarine flotilla, the *R–1*, was launched at New London, Conn., on July 12. The submarine, which is a sister ship of the *R–2*, was built by the New London Ship & Engine Co., under contract with the Electric Boat Co. The West Coast Leader of July 13 says they are both of the Holland type, single-hull construction, and equipped with the most modern devices known to the art of submarine construction and navigation. The vessel is propelled on the surface by two six-cylinder Nelseco Diesel engines.

The Republic of Peru has maintained at New London during the construction period of the two submarines a naval commission, under whose inspection the engines and propelling machinery of both the *R–1* and the *R–2* and the equipment for the submarine base at San Lorenzo Island have been constructed.

NOTE.—These two boats are of 800 tons' surface displacement, with a surface speed of about 14 knots. They closely resemble our "S–2" type.—Ed.

SPAIN

A. NAVAL

1. Future construction

On the 9th of August the King signed a decree law authorizing the expenditure over a 10-year period of 877,629,935.31 pesetas (about $140,000,000) for Spanish naval construction. It is understood that this sum will be taken up in the extraordinary budget. A list of the items of expenditure contained in the decree is given below.

The desirability of effective measures for the rehabilitation of the Spanish Navy has long been apparent, and the present decree is merely indicative of the natural solicitude of the dictatorship for the adequate defense of the country. Moreover, the insufficiency of the present naval establishment was emphasized during the recent hostilities in Morocco, when the Spanish Navy would, it is believed, have proved unequal to the tasks imposed upon it had it not been for the assistance rendered by French war vessels in patrolling the coast. To provide Spain with a navy of a strength commensurate

with the importance of the country is but a logical step in furtherance of General Prime de Rivera's program of catering to Spanish national pride and fostering the growth of the spirit of nationalism.

It will be noted that the largest vessels to be constructed under this appropriation are three cruisers of the *Washington* class, having a tonnage of 10,000 tons each. Provision is also made for the building of 3 destroyer flotilla leaders, 12 submarines, 2 oil tankers, and 3 patrol boats. It is understood that the construction of these vessels will be undertaken by the naval shipbuilding plant at Ferrol.

Details of the expenditure are:

	Pesetas
For the payment of obligations derived from the naval constructions authorized by laws dated Feb. 19, 1915, and Jan. 11, 1922	85,252,512.52
For payment of the last two installments of the contract for the construction of the motor sailboat *Sebastian Elcano*	3,027,881.60
For payment of torpedoes acquired at Fiume	7,061,714.15
For payment of last two installments of present naval construction	4,165,729.04
For payment of the new naval construction comprised in decree law of Mar. 31, 1926 (1 cruiser of 7,850 tons and 3 destroyers)	110,380,000.00
For the purchase of fire-control installations for the cruisers of the *Blas de Lezo* type	4,003,098.00
For the construction of 3 cruisers of the *Washington* type, of some 10,000 tons, at 87,000,000 pesetas each, and munitions for same	268,500,000.00
For the construction of 3 destroyer flotilla leaders, *Chacurra* type, at 16,460,000 pesetas each	49,380,000.00
For the construction of 12 submarines, type *C*, with such modifications advised by present or future improvements	144,000,000.00
For the construction of 2 oil tankers of about 7,000 tons	11,000,000.00
For the construction of 3 small ships for patrol duty	3,900,000.00
For the construction and purchase of mine-laying ships, ships for patrol duty of mine fields, etc., and accessories	12,000,000.00
Creation of aero-naval stations at Nahon, Cartagena, and Vigo:	
For fixed installations	15,000,000.00
For flying material	20,000,000.00
Creation of a school of applied naval aeronautics at Barcelona, industrial requirements of aeronautical service, fixed installations, and flying material included	10,000,000.00
For flying personnel	4,000,000.00
For purchase of submarine mines	6,000,000.00
For the purchase of obstruction nets and other means of defense for naval bases	6,000,000.00
For improvement of naval bases, the construction of dry docks for Nahon and Rios (Vigo) included	30,000,000.00
For improvement of the target range of Torregorda	3,500,000.00
For the construction of powder magazines at Cartagena	1,500,000.00
For the construction of powder magazines at El Ferrol	469,000.00

	Pesetas
For the construction of powder magazines at Cadiz	490,000.00
For attentions derived from the existing contract with Echevarrieta & Co. for the manufacture of torpedoes. (NOTE.—Torpedo factory will be erected at Cadiz instead of Cartagena.)	78,000,000.00
Total	877,629,935.31

As seen from the above the effort that is being made by Spain to improve her defensive means is quite considerable, due consideration being given to aerial defense. The main points of this program are the creation of the aero stations at Mahon (Balearic Islands), Cartagena, and Vigo, and the construction of 3 cruisers of 10,000 tons and 12 submarines. The construction of 1 cruiser of 7,850 tons and 3 destroyers is also included in the above expenditure.

From the above authorization it will be seen that the Spanish Government is taking upon itself a considerable debt. In the original budget for 1926 (six months—to January, 1927) the above naval expenditure was not mentioned. It is believed that the reports upon budgets are issued in this manner in order to confuse the general public upon the real state of finances of the country. Instead of making a more favorable showing the Government is becoming more hopelessly involved in debt as time progresses.

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2. Activities of the "Spanish Naval Construction Co."

[Source: Consular report]

A meeting of the stockholders of the Spanish Naval Construction Co (shipyards at Ferrol and Cartagena) under the presidency of the Conde de Zubiria was held on May 27 last for the purpose of receiving and considering the report, the financial condition, and the work accomplished by the company during the year 1925.

According to the report the shipyards, machine shops, and property owned by the company represent some 121,000,000 pesetas; cash, bills receivable, and securities, 15,000,000 pesetas; the total liquidations made up to December 31, 1925, 38,178,433 pesetas; while the company's stock represents 55,000,000 pesetas, the statutory reserve fund 10,884,221 pesetas, and outstanding obligations 32,000,000, all of which shows the fine condition of the company, its solidity, and the success it has achieved since its organization.

As a résumé of the work accomplished by the company, the report states that 97 vessels have been constructed for the naval and merchant marine with a total displacement of 297,257 tons and a total of 772,438 horsepower.

Among the most striking achievements of the company's work since the last meeting of the board the report refers to the contract for the construction of three new vessels of 10,000 tons each for the Compañia Transatlantica (Spanish royal mail); the order of the Government for the construction of a cruiser similar to the *Principe Alfonso* and of three destroyers of the *Churruca* type (probably under decree law of March 31, 1926; see above August 9 decree law expenditures); the success achieved by the navy with the cruiser *Blas de Lezo* (1924, 4,725 metric tons) and the destroyer *Alsedo* (1922, 1,150 tons) on their voyages to South America in connection with the flight of the *Plus Ultra;* the visits made to the shipyards and machine shops of the company by committees of chiefs and officers of the Argentine cruiser *Buenos Aires*, during which many flattering comments on the work of the company were heard; the attention which a foreign government is giving to the proposal of the company to manufacture various sorts of artillery; the studies which are being carried on for the purpose of presenting, on the invitation of the Spanish authorities, proposals for naval and artillery constructions to certain foreign countries, and the granting of the extraordinary premium to the company in the national machinery exposition recently held in Madrid.

During the year 1925 the company has delivered to the Spanish Navy the gunboat *Dato* (1,335 tons), the destroyer *Lazaga* (1,150 tons), and the submarines *Nos. 5* and *6* of series "B" (556/836 tons), these latter supplied with Diesel engines which, the report emphasizes, have been constructed for the first time in Spain in the machine shops of the Sociedad de Sestao (Bilbao), properly equipped for this work.

In regard to the work under way the report refers to the cruisers *Principe Alfonso* and *Almirante Cervera* (7,580 tons); destroyers *Churruca*, *Alcala Caliano*, and *Sanchez Barcaiztegui* (1,650 tons), the first of which in its speed tests recently held made over 39 miles per hour, having on board a committee of officials from the Argentine cruiser *Buenos Aires;* the six submarines of series C 915 1,290 tons), the guns of all these vessels, field pieces, and coast-guard guns; the trans-Atlantic steamers *Juan Sebastian Elcano*, *Marquis de Comillas*, and *Magallanes* and various railroad material; while at the same time furnishing the great machine shops of Remosa and other Spanish shops with important products.

B. MILITARY

1. Situation in Morocco

[Source: N. I. D.]

FRENCH-SPANISH NEGOTIATIONS

The negotiations for a French-Spanish agreement in regard to Morocco which were being prosecuted at Paris were completed on July 13, when General Primo de Rivera, Sr. Quiñones de Laón, and Colonel Orgaz, on the Spanish side, and M. Briand, Marshal Petain, General Simon, M. Felipe Berthelot, M. Ponset, and Colonel Nogues, on the French side, signed the new agreement to take the place of the previous arrangements agreed upon in June–July, 1925, and February 6, 1926.

This agreement, as per official note recently published, contains the following points:

(*a*) *Boundaries.*—While the general lines of the French-Spanish treaty of 1922 will be observed, a mixed technical commission will undertake the marking out of the frontier in detail on the ground. Those cases in which doubt may arise will be solved in common accord.

(*b*) *Maritime vigilance.*—Each power will guard independently its jurisdictional waters. On the Atlantic, however, on the littoral comprised between the Rivers Uad Bu Sedra and Uad Dra the vigilance will be handled jointly.

(*c*) *Zones of contact.*—Both nations have the right of entry into the other's territory in the vicinity of their respective zones, but in no case will the penetration into the neighboring zone involve any change in the boundaries. Aviation of both nations is also permitted to fly over the adjoining territory when necessary.

The two governments will prosecute in common accord the pacification of the territory under the strict observance of the treaties which guarantee the integrity of the Xerifiian Government. In view of the success attained through the recent military operations the cooperation between the two powers will have in the future a marked political character. The belief is officially expressed that this policy will bring forth the total pacification and future welfare of Morocco.

THE MILITARY OPERATIONS

The unprecedented success attained by Major Capaz with his "harca" of natives culminated on July 13 with the occupation of Uad Lau. This makes an unbroken front for the Spaniards on all the littoral comprised in the protectorate, from the River Muluya (Malilla zone) to the River Lucus (Larache zone). It is not neces-

easy to emphasize the importance of the above fact when considering that the rebels received much of the war supplies through the coast, especially by the small bays so abundant on the Gomara coast. The rebellion, which now is centered in the rough territory of the Yebala Mountains, sees how every day the number of its followers is decreasing. The important caid El Bakali has submitted to the Spaniards and with him all the tribe of Beni-Said. The Riffian leaders, El Hattat, who was placed by Abd-el-Krim in command of Gomara, and Hamed Budra, who was minister of war of the surrendered chieftain, have been taken prisoners by Major Capaz.

The following is illustrative of the feat of the "harca" of Major Capaz:

Just after the surrender of Abd-el-Krim, and in order to press the advantage so gained the Spanish command decided that an attempt should be made to advance by the coast with a view to connect the eastern and western zones. To do this with the regular army meant much expenditure and presented many difficulties on account of the rough nature of the territory. So it was decided that the regular troops should remain where they were and that Major Capaz, who previous to the withdrawal of the Spanish troops in 1925 cooperated in the submission of this same territory, should be given the task of subjugating the coastal tribes. Accordingly he was placed in command of a "harca" composed of trusted native troops and given a free hand to proceed.

Such has been the energy and activity displayed by Major Capaz that all the tribes of the coast which still were in rebellion have been disarmed, and organized in the service of Spain in the short term of a month. Major Capaz is now directing his efforts to the political attraction of the tribes of the interior, where he has already occupied Zoco el Had and Taudret.

The total of war material delivered by the natives or taken by the Spaniards since the fall of Abd-el-Krim follows:

13,248 rifles,
213 guns,
6 mortars,
227 machine guns,
4,275 pounds of heavy gun ammunition,

and much other war material and supplies of various kinds.

This system of disarming the tribes is believed to be the only means of attaining a more or less permanent pacification of the territory. The previous policy of leaving arms to the natives has proven a fatal one for Spain. However, the disarmed tribes need a protective force to keep them safe from marauders and rebel contingents that will always probably remain in the mountainous ter-

ritory of the interior, and to maintain such a protective force all over the territory of the protectorate means a large force of occupation and therefore large expenditures.

SPECIAL ARTICLES

1. MILITARY DEVELOPMENT OF HAWAII

By Lieut. Commander Sydney Ballou, U. S. N. R. F.

NOTE.—The following article was submitted to the United States Naval Institute for publication, but, on account of its nature, it is being printed instead in this confidential periodical.—Ed.

The strategic value of the Hawaiian Islands has been recognized for nearly a century. With the growing importance of the Pacific, long predicted and now in the full course of realization, this value had steadily increased. Two great milestones mark its progress, the annexation of the islands in 1898 and the Washington Conference of 1922 which made them the western limit of possible fortification and military development. Both as an outlying defense and as a base from which to launch a military offensive, Hawaii is now indispensable to the security of the United States.

Pearl Harbor was acquired by treaty in 1877, but it was not until the present century that any steps were taken toward the utilization. Shortly after annexation the coral bar was dredged to a depth of 35 feet, the tortuous channel roughly straightened, and a large dry dock built, with 35 feet of water over the sill. Around the dry dock a naval station has grown with good facilities for refueling and repair. Ford Island, just opposite the dry dock, has been made the aviation center for both Army and Navy.

In 1877, when the reciprocity treaty was negotiated, it was said that Pearl Harbor "could shelter the navies of the world." Harbors, however, have an uncanny habit of growing smaller, which means, of course, in proportion to the ships they have to serve. In recent times the acceleration in size and draft of warships has been at a tremendous rate, and only the Washington Conference, with its authoritative limit of the size of battleships, has enabled us to catch our breath and make plans which will not be out of date in a decade.

The popular phrase concerning Pearl Harbor has persisted to this day. It has therefore been a distinct shock to the American public to be told how utterly inadequate it has become. Our modern battleships draw 32 feet at normal draft. When fully loaded, they may touch 35 feet, with no allowance for injury which might

flood a compartment. Thirty-five feet on the bar and at the dry-dock entrance is plainly insufficient for emergencies.

The next obstacle is the crooked channel. None of our battleships of the largest size has ever been in Pearl Harbor. None would wish to make the attempt without the aid of tugs to help at the turns, a condition which makes prohibitive any war-time entrance or exit of a fleet.

Once inside, the draft of modern vessels has cut available anchorage space to a minimum. Only one of the lochs has any water of the required depth, and here about four battleships might anchor. More could be packed in if wharves were constructed, but for the moment we are dealing with conditions as they exist to-day.

Coast Defenses

Of the fortifications of Oahu much the same story must be told. They began after the Spanish war with groups of 12-inch mortars at Diamond Head and at the entrance to Pearl Harbor. Even these were not the latest design of that date. They were on hand and apparently considered the cheapest to install. Followed two 14-inch rifles at Waikiki and two 12-inch rifles at Pearl Harbor. They were on disappearing carriages, a mount which does not permit of the elevations which have developed since the World War. The effective range of all this pre-war equipment is in the neighborhood of 15,000 yards, about half the range of a modern dreadnought.

Since the war four fixed guns have been mounted. Two of these are 12-inch guns, with a range of 27,000 yards, or not quite that of the latest type of battleship. The other two, just west of Pearl Harbor entrance, are thoroughly modern 16-inch guns with range well over 40,000 yards. These two guns, it will be noted, are the only ones on the island which can outrange the latest naval guns afloat and so the only one which could do anything toward preventing a direct bombardment of the naval base or of such vessels as might be seeking shelter in Honolulu or Pearl Harbor.

All these fixed defenses are concentrated on the south side of Oahu. For the defense of the other coasts the reliance is wholly on mobile guns, 12-inch railway mortars, 155-millimeter (6-inch) guns on tractor mounts, and the like. Of these there is a good supply. They are designed to deal with landing parties after they are in their small boats or with transports landing by beaching. They can not stand off the battleships or cruisers which, with their tremendous weight of metal, are shelling the beaches, searching for the hidden position of these very guns, in support of the landing.

So much for present conditions. They may be summarized in the one word, "obsolescence." It is inevitable that the plans and projects,

the forts, harbors, and guns of one generation must become obsolete in the next. The World War left greatly changed ideas of the range of guns, the size of overseas expeditions, and generally of the whole business of war. Hawaii should be brought up to date.

Navy Yards and Fleet Bases

The first step is to educate Congress and the public as to the difference between a navy yard and a naval base. It would be better to call the latter a "fleet base" to emphasize the difference. The primary purpose of the former is repair, which may be a retail establishment. The primary purpose of the latter is outfitting and supply, for which it must be prepared along wholesale lines.

The fact that before the war many navy yards were made to serve for both purposes is the confusing fact that clouds the issue. A fleet base should have a navy yard as an important adjunct, just as a house should have a garage, but upon the present scale of things a navy yard can no more be a fleet base than a garage can be a mansion.

One hundred and forty-three naval vessels were in Hawaiian waters during the maneuvers in 1925. The destroyers and submarines berthed in Pearl Harbor, that is, they slept in the garage. The battleships and cruisers rolled uncomfortably on the open shelf of the south shore of Oahu, stretching from Pearl Harbor entrance past Honolulu to Diamond Head. For a fortnight the fleet tried out Lahaina Roads, under the mountains of West Maui, then came back to roll for a month off Oahu. This was summer time in the steady trade winds. Neither anchorage would have been tenable in a kona storm, such as comes from the south in the winter.

These were peace-time maneuvers. The fleet was not at war strength, particularly in the number of auxiliary vessels which would have been along had it been on serious business. Six battleships, one-third of our capital force, were missing.

For a real overseas expedition, such as the recapture of the Philippines would involve, this number would be nearly doubled. Great transports, converted merchant liners, and another horde of necessary supply and fuel ships would probably bring the total to the neighborhood of 250 vessels.

These are the ships that a fleet base must accommodate. Only a small proportion of them may need repairs, the primary duty of a navy yard. They all, however, need protected anchorage or wharfage. They need to take on fuel and supplies. They need absolute security from the cruising submarine, whether torpedo or mine layer.

They need to be able to get in and to get out, as a whole, within a reasonable time.

On the Atlantic side we have a fleet base at Hampton Roads, with its complementary navy yard at Norfolk, a typical example of the relation which should exist between the two. On the Pacific the garage at Mare Island is crying that if it can not be the whole house there shall not be any house, and San Francisco is left without a base. In Hawaii there is no local issue to prevent the development of a naval base wherever one is possible. Unfortunately adequate sites are few.

There are three possibilities under consideration—the Pearl Harbor-Honolulu area, Lahaina Roads, and Kaneohe Bay. Each has its special advantages and disadvantages.

PEARL HARBOR-HONOLULU

Pearl Harbor and Honolulu Harbor entrances lie 11 miles apart, an inconvenience, but not a serious disadvantage to treating them as one harbor area. Both, however, are very small in proportion to the needs of a fleet base. At present they are utterly inadequate.

There is an authorized plan for the improvement of Pearl Harbor, for which appropriations have already been made. This will give us a channel deep and straight enough for our battleships to enter, with more room to maneuver when inside. It is no more than is necessary to give us a first-class usable navy yard. It will not give us a fleet base, nor anything like one. Further expansion must take the form of dredging the shallow waters of the west and middle lochs and of building a multitude of wharves or a system of bollards, so that all vessels may tie up instead of swinging at anchor.

Honolulu Harbor is a mere pocket handkerchief on the map. It holds more than its size would indicate, however, on account of its extensive wharf system. Per contra, it is a commercial port, already crowded, and a certain amount of wharfage must be devoted to commercial uses even in time of war. In the days of the Pacific Squadron 8 big armored cruisers used to get in and out very expeditiously, but 8 ships are not 150.

Commercial needs are forcing a gradual expansion of this harbor. There is a reserved channel, 600 feet wide, extending to the westward, which is being gradually dredged. If extended far enough, it will reach Kalihi entrance, a deep-water channel which can be readily improved to make a second entrance to the harbor. Beyond the Kalihi entrance is a considerable area of shallow lagoons, which might be dredged.

The westernmost of these lagoons ends less than 2,000 yards from the east loch of Pearl Harbor, so that it has actually been

proposed to connect the whole series. This would give three separate entrances, and would largely remove the apprehension of being blocked in by accident or design, a danger inherent in the long, narrow channel which gives entrance to Pearl Harbor.

All this, however, means the removal of a vast quantity of material and the building of a great number of wharves.

As an incidental advantage, the Pearl Harbor-Honolulu area has the benefit not only of the repair facilities of the navy yard but also of some very efficient iron works in Honolulu of sufficient capacity to build sugar mills. The entire area is under full protection of the coast-defense guns already mounted in Oahu.

LAHAINA ROADS

Lahaina Roads is an open roadstead off the west coast of Maui. It is 70 miles from Honolulu, across two channels. It lies under the towering mountains of West Maui, which in the prevalent trade-wind weather affords a sufficient lee. To the west and southwest it is partly inclosed by the islands of Lanai and Kahoolawe.

In area it leaves nothing to be desired. The Great Fleet which anchored there in May, 1925, could have been doubled without straining its limits. In trade-wind weather it proved an ideal anchorage. Sorties through hypothetical barriers were executed promptly and without difficulty.

As a fleet base, however, it has serious drawbacks. Its greatest defect is that it is far too open to afford protection from the lurking submarine or the long-range torpedo. Its four entrances are wide and deep. Those south of Molokai are 7 miles wide. To the south of Lanai the channel, which bears the significant name of Kealaikahiki,[1] is 15 miles wide with 100 fathoms of water. An anchored fleet lies opposite and broadside to this entrance. Between Maui and Kahoolawe is another deep entrance. Barriers and mines would have to be unusually trustworthy to insure safety in this situation.

Frequent references have been made to trade-wind weather. This prevails nine months in the year, but the remaining three are subject to heavy storms from the south. Lahaina Roads would be disagreeable, if not untenable. Whether there is sufficient alternative anchorage to the north of Lanai and Kahoolawe, and how good such anchorage would be has never been demonstrated.

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[1] "*The way to Tahiti.*"—When Captain Cook discovered the islands in 1777, they had been for centuries cut off from and without knowledge of the outer world. Much to his surprise he found that the natives could converse with his Tahitian interpreter. Only oral tradition and this appropriate name remained to recall the lost art of navigation by which regular communication with Tahiti had been maintained as late as the ninth and tenth centuries. "Tahiti" had become a fabled land, peopled with mythological creatures, from which the great God Lono was to come.

Other disadvantages of the roads are remoteness from the navy yard, which should be an immediate adjunct, remoteness from any other repair facilities and from all supplies other than unlimited sugar cane and pineapples. It is true that a fleet with its train is theoretically self-supporting, but it is the very function of a naval base to afford supplementary facilities and supplies and these are utterly absent.

Last of all, Lahaina Roads is unprotected by any fortifications either present or projected. This makes it impracticable to remedy its deficiencies by permanent construction even of warehouses for supplies. Altogether, Lahaina Roads may furnish a makeshift anchorage in time of need, but it is not and can not be made a fleet base.

KANEOHE BAY

Kaneohe Bay lies on the northeast coast of Oahu, the opposite side from Pearl Harbor. It is cut off from Honolulu and Pearl Harbor by the precipitous Koolau Range. An automobile road runs over the one pass at Nuuanu Pali and around the northern end of the island; a horseback trail gives difficult passage around the southern end. Elsewhere the range is usually considered impassible for military purposes, although there are several points at which it can be and has been crossed by adventurous trampers, and trails can be readily built anywhere with pick and shovel.

Neither the scenic view from The Pali nor the ordinary commercial map gives any idea of the character of the bay. Its great barrier island is barely awash at low water, but nevertheless affords perfect protection. Kona storms are cut off by Oahu itself.

The bay is now navigable for small steamers, which serve the pineapple plantations. It is, however, infested with coral heads, numerous small islets, which rise to within a few feet of the surface. For naval development many of these would have to be removed and the channel dredged through the coral reef. The cost would be considerable but not prohibitive.

The result would be a landlocked harbor some 6 miles in length and half a mile to a mile in width, protected partly by the jutting peninsula of Mokapu and partly by the barrier island. A second channel at the northern end is entirely practicable, while 3,000 yards of dredging through the fishponds of the peninsula would give a third.

Kaneohe Bay is not as near Pearl Harbor as one could wish. It its 40 miles by water, while land communication over The Pali is far from ideal. The railroad around the northern end of the island could be extended to the bay, while ultimately a tunnel will be driven through the Koolau Range from the head of Manoa Valley.

So far as coast defense is concerned, it would mean the installation of two or four 16-inch guns on the northeastern coast, together with some smaller batteries on the salient of Mokapu. All this, however, would help the all-round defense of Oahu, which is desirable in any event. The island is too important an outpost to be left with any back doors.

A fleet base at Kaneohe Bay would not mean the scrapping of any of the facilities of Pearl Harbor. It might mean duplication to some extent, such as oil tanks and warehouses, but this would be relatively unimportant. The next and much-needed dry dock will probably be a floating dry dock in any event, and if this calls for additional repair accessories they could be located at either place.

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2. THE LÜTZOW AT JUTLAND

(NOTE.—The following, appearing in the Engineer of July 9, 1926, is an abridged version of an interesting paper on the experiences of the German battle cruiser *Lützow* at Jutland, which was published in full in the May number of the Marine Rundschau. The author is Commander Günther Paschen, a retired officer of the German Navy, who was gunnery officer of the *Lützow* at the time of the battle.—*Ed.*)

When on the day of Jutland the heavy enemy forces were sighted at 5 p. m.,[1] he was able to make out with certainty the forms of battleships astern of the battle cruisers, which were at least 26 kilometers (16¼ miles) distant. This shows the very high visibility that prevailed toward the west. The first salvo was fired from A and B turrets at 5.48 p. m., the range as shown on the instruments being 167 hectometers.[2] The *Lützow* fired turret salvos throughout the action alternately from the forward and after group of turrets, "a method of fire which I can not sufficiently commend." Both guns worked as a unit, being loaded together and laid by one man. After loading there was silence in the turret. The gun layer caused the sights to be adjusted for deflection as requisite. As the smoke of the guns was always concentrated at one end of the ship, one or other of the two control towers always had a clear field of vision.

Only once did I fire a full salvo from all four turrets; the result did not encourage me to repeat it. The projectiles pitched short or very short, the whole target being obscured by their splashes. The time of flight was 22 seconds. At first the range was overestimated, and all the opening salvos were over by about 16 hectometers. It was the same with the enemy. He, too, opened fire at 167 hectometers and shot well over us but took endless time to find the correct range. We were surprised when at length the *Lion* strad-

[1] The times quoted are German summer time, i. e., one hour fast on central European time.

[2] One hectometer=109.4 yards.

dled us, scoring a light hit on the forecastle. Our own fire now became and remained accurate. A sharp turn of four points to starboard by the enemy was promptly detected. At 5.52 p. m. we already registered our third hit on *Lion's*. Red flames came from her third turret, and a large fragment, half the gun house roof, flew into the air. After a fairly long interval the turret suddenly caught fire and burnt out, but the officer of the turret, although dying, had caused the magazine doors to be closed. That saved the *Lion* and her admiral. My personal conviction is that the extraordinary way in which the British ships blew up was due to cordite fires, which developed into explosions. With us such fires remained fires only, fatal to the turrets in which they occurred but not destructive for the ship. Various reasons satisfy me that the explosions were not caused directly by detonating shell. Seventeen minutes after fire had been opened the *Lion's* helm was put hard over, until her stern was pointing toward us, while the *Princess Royal* forged ahead. Meanwhile I had counted 6 hits in 31 salvos. We ourselves had received 3 shells, one of which detonated between the barbettes of turrets A and B and wrecked the forward dressing station, causing severe casualties. Another hit was on the armor, where it produced a severe concussion but no actual damage. At 6.8 p. m. we switched our fire onto *Princess Royal*. The enemy was now making sharp alterations of course, and the smoke and failing visibility rendered it difficult to follow him. The range closed swiftly from 151 to 130, when it just as swiftly opened to 190 and closed again to 150 hectometers. Somewhat ahead of the British line there steamed a destroyer, which emitted dense clouds of smoke and hid the target from our view. As the British fire-control tops always remained visible, I assumed this to be a clever trick on the part of an enemy who possessed the firing-director system: but Admiral Beatty has since explained that the destroyer was there as an antisubmarine screen and that its smoke vexed his own gunners as much as it did ours. At this juncture we were not being hit at all, while our own salvos pitched well and frequent hits were observed. The British have always maintained that our fire was invariably rapid and accurate in the beginning but that it soon fell off and became wild, while their own shooting, though slow in finding the target, remained steady and precise throughout. Nevertheless, neither the *Lion* nor the *Princess Royal* made a single hit on us between 6.20 p. m. and 7.23 p. m. and scored only 3 hits all together in 1 hour and 35 minutes. Within the same period both ships received a total of 12 hits by their own admission. That our fire was not always so effective as in the first 40 minutes was due to the increasing interference of smoke and declining visibility. Subsequently the latter became so bad that in the critical phase, soon after 8 to 9 p. m., not a single British ship was in sight except the *Invincible*, which was promptly destroyed. We, on the other hand, were continually under the heaviest fire, being plainly outlined against the clear western sky.

One observation we made early in the action caused us surprise and relief. Two enemy shells, falling short, richochetted and passed over the ship—two long, white projectiles, which I recognized as common shell by their color. Black powder! And such, speaking generally, was the effect of the British shell. Their impact had the full fury of their large caliber; wherever they hit there was a mighty shock and a cavernous hole. But the effect of the burst was comparatively small. Once our control station was filled with the familiar smell of black powder, at which we smiled knowingly. We did

receive some high-explosive shell, but apparently none of the armor-piercing type, and the effect of the former was superficial.

The author then dwells upon the efficiency of the German A. P.-H. E. projectile, and adds:

To this day I blame myself for not having fired A. P. projectiles in the first hour of the action, instead of H. E. I acted on general instructions, reenforced at the last moment by advice from an authoritative source. Had I loaded with A. P. shell, the *Lion* and her admiral would probably not have lived to tell the tale. It is in any case remarkable that one of these H. E. shell would have penetrated a turret roof in the *Lion* at an oblique angle, and that it did not break up but detonated.

Here the author complains that the gunnery control-tower periscope, from which the "follow the pointer" instrument was controlled, was constantly deluged with spray from falling projectiles, and at times was rendered useless.

He then proceeds to describe the arrival of the German Battle Fleet, and the maneuvers which followed the appearance on the scene of Admiral Jellicoe, with the Grand Fleet.

At 7.41 p. m. we came under a heavy fire from Admiral Beatty's ships. Two plunging hits took effect in the main 6-inch casemate, wrecking both W/T stations and causing heavy casualties. A third shell exploded amidships, but without seriously damaging the armor deck.

And now began an experience to which everything before had been child's play. One projectile crashed into the upper deck at the height of the forward funnel, entered the casemate, and detonated abaft the barbette trunk of turret B. It started a fierce fire and blew away both the armored hatches that gave access from the casemate to the forecastle. The detonation occurred immediately beneath the conning tower, but did no damage to this or the single 6-inch casemates near by. Another shell hit the right-hand gun of turret A, very close to the gun port, from which it tore a large fragment. It then struck the right-hand wall of turret B, where it broke up, but the 250-millimeter (9.8-inch) armor had been perforated, and splinters were driven into the gunhouse, where they destroyed the loading gear of the right-hand gun, killed the crew, and set fire to two powder cartridges in the upper hoist. The turret officer was killed, the turret itself was plunged into darkness by the cutting of all cable leads, the pumps were empty, the turret was full of smoke and flooded with glycerine; but the left-hand gun on the other side of the splinter bulkhead was intact and its crew unharmed. Within half an hour this gun was again ready for action. The sinister red flashes on the port bow came from the British Third Battle Cruiser Squadron, which was ahead of the Grand Fleet, and, being itself invisible to us, was able to close to within the most effective range. It was probably from this squadron that we now received the fatal hit, the full effect of which only made itself felt later on. Every ship has "spot softs," and our Achilles' tendon was the broadside torpedo flat forward of A turret. In order to save space, the torpedo bulkhead had not been carried as far as this point, and we were thus deprived of the incomparable protection against underwater hits that was a distinguishing feature of our ships, as compared with those of the enemy. At the point in question, two heavy projectiles now pierced us below the armor belt, exploding with

such violence as to flood practically all the compartments forward of turret A. The ship reeled under the mighty blow. From turret A came news of the wrecking of the starboard gun and of the gradual percolation of water into the magazines. Unfortunately there was direct communication between the inner compartment of the barbette and the torpedo flat by means of a small hatch in the main protective deck—an emergency exit—and this hatch had been blown away by the explosion. When the source of the leak was discovered, it was too late to do anything. The seat of the trouble was in a small narrow flat below waterline and no longer accessible.

At this juncture the *Invincible*, Admiral Hood's flagship, which had been administering such heavy punishment to the enemy, was suddenly outlined against the horizon. She was at once engaged *by the Lützow* and *Derfflinger*, and eventually blew up. From then on (8.43 p. m.) the *Lützow* took no further part in the action. Admiral Hipper was on the point of leaving his disabled flagship for another vessel when she came again under a heavy fire.

Two or three shells crashed into our ship further astern. One detonated on the main deck between C and D turrets. Another destroyed the electric-power cable to D turret, which at this point, and quite exceptionally, was carried for a short distance above the main armor deck. D turret was thus reduced to hand gear, which in the case of a 12-inch means virtual disablement. The same shell ruptured the main amored deck

A survey of the ship showed that only 4 of the big guns remained serviceable, and that only 3 out of the 14 5.9-inch guns were intact. Seven searchlights were gone, leaving but one available. As all communication leads were cut, orders had to be transmitted by word of mouth. Meanwhile the ship had been settling down, until the upper edge of the stem was under water. The whole fore part was flooded, save for an electric-switchboard room far below the surface, where a number of men had assembled. At 2 a. m. it was reported that 7,500 tons of water were in the ship and that there was no hope of keeping her afloat for more than six hours longer. The forecastle was 6½ feet under water, which still flowed in through the open casemates and poured below through the ruptured armor deck. The draft forward was 56 feet. There was nothing for it but to abandon ship. Just before 3 a. m. the order was given for all hands to assemble aft, and four destroyers came alongside. The officers made a final round of the ship to see that nobody had been overlooked. The scene in the main 5.9-inch battery was indescribable.

It was there that our heaviest losses had occurred. In turret B it was too dark to see anything, but I learnt with satisfaction from survivors that the fire caused by burning cartridges in the upper hoist had been purely local. On board the *Lützow* we had taken every precaution against cordite fires, and these measures had proved fully effective. The crew were now transferred to the destroyers in perfect order. As we pushed off I turned and looked at the ship in the first light of dawn. The bow turret was completely sub-

merged, while turret B formed an island. At the bridge the water had risen as high as the upper deck, while the stern was 6½ feet above its normal level. One of the destroyers then fired a torpedo, which struck the *Lützow* amidships, causing her to heel to starboard.

The actual time of sinking is not stated. Commander Paschen concludes his narrative as follows:

The ordnance material of the *Lützow*, the turret equipment, the guns, communications, and fire-control gear worked faultlessly all through the action except where they were damaged by enemy fire. The perfect functioning of the fire-control system deserves particular mention as showing that the most complicated technical instruments are absolutely reliable when properly served and well protected. I must add, however, that we felt acutely the want of two instruments which we might have possessed had their importance been sufficiently appreciated beforehand. The enemy had them both, viz, the central director with the follow-the-pointer system and the plotting table. Our own follow-the-pointer gear (Richtungsweiser), without which the action could not have been fought at all, was a half measure. In the critical period between 8 and 9.30 p. m., the possession of director control for the guns would have materially improved the situation of the German Fleet. The plottting of the enemy's speed and course is of equal importance. In the first two hours of the battle it was quite impossible to estimate the enemy's continual alterations of course by calculation which visibility was poor and the ranges were long. Nor could his speed be judged when his ships showed only one-quarter of their hulls above the rim of the horizon. In spite of the excellent training of our gunnery officers, we relied too much on headwork and ability to make mental calculations. Whenever it was proposed further to develop the mechanical side of fire control, we were always warned against having too many instruments which would break down in action. On the contrary, it is the man who becomes tired and finally makes mistakes, not the machine. One's head should not be bothered in the stress of action with things which can be done in a simple way by mechanical agency. The gunnery officer has quite enough to do in forming his judgment from the data transmitted to him by mechanical means.

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3. DEVELOPMENT OF MILITARY PLANES

(NOTE.—The following article is composed of excerpts from a lecture given before the Scientific Aeronautical Association in Frankfort-on-the-Main.—*Ed.*)

The biplane is unquestionably the most common type of airplane at the present time, its construction being carried out in a great variety of types. Besides the usual types of spanned one-strut, two-strut, and multiple-strut construction, other special types are frequently used for army airplanes, such as nonspanned biplanes, semi-strut sections, and trelliswork sections. The only type which has not been adopted is the biplane with cantilever wings.

The choice of type depends upon the object pursued by the engineer. If it is desired to obtain light weight combined with a moderate wing load, such, for instance, as is necessary for an efficient night bomber, the best type adapted for that purpose would be that

of a spanned multiple strut airplane, according to the foreign point of view. Such are the Farman *Goliath* two and three motor biplanes which have been widely adopted in the French air forces, as well as the Caudron and Potez bombing airplanes. Troop transport airplanes such as the Armstrong *Atalanta* two-motor biplane (two 500-horsepower Napier Lions), the Viecker's *Virginia* two-motor biplane (two 500-horsepower Napier Lions) belong to the same type. If, on the contrary, the chief object is the attainment of high speed, it will be necessary to reckon with larger wing weights in order to obtain lesser resistance. This purpose will be attained by one or half strut biplane sections. There does not seem to be any tendency abroad in favor of elimination of the bracings, but the only wires employed are profile wires whose air resistances are comparatively small.

The Fokker airplane is the most widely spread representative of that type of construction which is marked by the absence of external bracings. The high efficiency of the Fokker machines is a proof in favor of the advisability of eliminating external bracings and of reducing the wing struts to the lowest possible number. The successes obtained by the Fokker airplanes have led to the adoption for military airplanes of the type of wing construction exemplified by our Fokker *D–VII* pursuit single-seater.

Fokker himself, however, has not adhered to this type of wing construction. His latest pursuit single-seaters have a very small bottom wing whose main spar is trussed against the two main spars of the large overhanging upper wing with a V strut without any external bracings. These machines show a reversion to the type of the sesquiplane, unless one prefers to regard them as a biplane with high wing surfaces and special wing support in view of the very small size of the bottom wing. The sesquiplane is a biplane whose top wing has a much wider span and greater depth than the bottom one; next to the biplane with high wing surfaces, it provided the best firing field and field of vision and has therefore been extensively adopted.

This is exemplified by one of the best French Army airplanes, the *Breguet XIX* biplane, which has been adopted for military air service in France, Poland, Yugoslavia, Spain, Turkey, etc. It is equally well adapted for scouting and for day bombing, with corresponding variations in the internal arrangement, supporting surfaces, and weight. It is unquestionably one of the most efficient and best-constructed machines of the French air forces. It is built entirely of duraluminum, which is employed to the best possible advantage. Its static construction does not seem to be quite satisfactory, because the main supporting members of the wing framework are connected

with parts of the landing gear. The German construction regulations for army airplanes have always stressed the rule that there should be no connection between the landing gear and any supporting members of the wing frame. This well-founded requirement is neglected in France and elsewhere. There are a number of foreign machines in which the wing bracings and wing struts are connected with parts of the landing gear. The great drawback of this arrangement is that the supporting members are necessarily involved in any damage which the landing gear might undergo. The wings are the most expensive part of the machine and the most difficult to repair, and it is important that they should be protected as far as possible from the frequent accidents to which an airplane is exposed. The prevailing opinion in Germany is that the *Breguet XIX* biplane is not fitted for military purposes in view of the above-stated defect.

The constructive arrangement of the *Breguet XIX* is, however, unquestionably a very noteworthy one. Its light metal construction is shown on the photograph. [Not reproduced here.—*Ed.*] The left sketch shows the fastening of the bracing cables. In the middle one may distinguish the lower front end of the adjustable wing stay, which is built of duraluminum sheet iron riveted over a form. The wing construction with the front duraluminum lattice spar is visible on the right. Each wing has two spars. The ribs consist of duraluminum profiles. The wings are built separate with a slight backward sweep of 5 per cent. The top wings have a moderate dihedral, which is absent in the bottom wings; also, they alone are equipped with rudders. The elevator is the only part of the steering control which is provided with balancing surfaces. The fuselage consists of duraluminum tubing, which is fastened and braced together with connecting pieces of the same material. The whole construction is remarkably well thought out, but it is only adapted for serial construction in great numbers, and even under those conditions it is more expensive than, for instance, Dornier's metal construction.

The hanging coolers can be drawn in during flight. Every modern army plane has an appliance for regulating the temperature of the cooling water. The flexible water conduction (Levasseur system) consists of galvanically coppered steel strips wound spirally around a tube of elastic fabric and packed with asbestos fiber.

The oil and benzine plants consist of two separate tanks under ordinary atmospheric pressure situated in the fuselage in front of the seats. The tanks are shot and fire proof, being provided with rubber envelopes. Two pumps actuated by the motor draw the benzine from the tanks and supply both the sprays. If one of the pumps gets damaged, it shuts off automatically and the other pump

takes its place, furnishing the double fuel supply without any interference on the part of the fliers. Any damage in the fuel pump is revealed by the manometer, in which the pressure of the fuel falls from 2.3 m. column of liquid to 1.5 m.

In distinction to the pursuit one-seaters, Fokker's two-seaters show a return to the external type of the Fokker *D–VII*. The construction is unaltered in the main lines, but many details have been improved, with the result that the flight qualities and flight performances of these Dutch machines surpass those of most army airplanes of the same type. Their high degree of efficiency is due in great part to the personal contact established between the building engineer and the flier, which enables them to work together to the best advantage and which is hardly to be met with anywhere except in the Fokker works. A collaboration of this sort is one of the chief requirements of modern airplane construction.

The Fokker *DC–I* has been extensively adopted for pursuit and scouting purposes. It was evolved out of the heavier and larger Fokker *C–IV* and is furnished with the same 500-horsepower high-compression Napier Lion. It is a highly efficient machine both as regards its flying qualities and its flight performances.

The newest Fokker two-seater, *C–V*, with a 400-horsepower Liberty, which is being built for the United States, was evolved out of the *C–IV* and the *DC–I*. Its fuselage is somewhat narrower than that of the *C–IV*; its novelty consists in that its front part is detachable. A bow cooler is installed in the nose. All these Fokker two-seaters, even when fully loaded, are adapted to the performance of any sort of stunt flight. The superior maneuverability (facility in turning) of the Fokker *C–IV* with a 500-horsepower Napier Lion, as compared with the French Dewoitine *C–I* one-seater pursuit monoplane, was evidenced in a recent competition flight.

As stated above, the constructive development of the modern army airplane is tending more and more toward the half-cantilever biplane and the single-strut biplane. The question is as yet undecided as to whether it is better to eliminate bracings altogether or to truss the wing framework with tension members in the usual way. Stiff corner construction with square L girders has not been generally adopted, owing to the increase of weight entailed, which reduces the flight performance in spite of the economy of head resistance. That is the reason why the traversing frame, which was adopted on the American La Père biplane instead of two crossed struts, has been abandoned. Wing struts in I construction are seldom used.

As regards small and medium airplanes, however, there is an undoubted tendency to supplant the former normal bracings and double struts by a single-strut form of construction. This line of

development is especially apparent in the newest British Army airplanes. The *Vickers Vixen* pursuit two-seater with a 450-horsepower Napier Lion is an example of a pursuit two-seater designed for the same purpose as the Bristol *Fighter*.

In special construction, however, such as heavy torpedo airplanes with one motor, the usual type of a normally braced biplane with two or more struts continues to predominate. Such is the Handley-Page *Handley* torpedo biplane with a 450-horsepower Napier Lion, which is especially noteworthy as offering the first instance of the adaptation of slot wings on a military airplane. The landing gear is characteristic for torpedo airplanes.

Pursuit one-seaters usually have only a single strut. Exceptions to this rule are offered by the Newport *29–C–I* pursuit one-seater mentioned above and the Curtiss pursuit one-seater. The latter is remarkable for its speed, having crossed the North American Continent between sunrise and sunset in an endurance competition flight. It has a steel-tubing fuselage, timber wings, and is fitted with the famous 400-horsepower Curtiss D–12 motor. A very high standard of construction is offered by the British short scouting two-seater with a 400-horsepower Bristol Jupiter motor. It has a whole-metal construction, bearing many points of resemblance to the Dornier constructions.

The Italian Ansaldo *SVA–5* scouting plane is neither single nor double struts, its supporting cell having a V strut, which is typical for modern Italian Army airplanes, and of which we have a few examples in our country also. A similar supporting plane construction is offered by the Italian Fiat *C–R* pursuit airplane, a very efficient single-seater fitted with a 300-horsepower Hispano Suiza motor. It is remarkable for the small size of the bottom wings, which include the balanced rudders.

An example of the normal one-strut pursuit one-seater is offered by the Parnall *Plover*, with a 400-horsepower Bristol Jupiter motor, which is especially designed to be operated from airplane carriers. In view of the special purpose of this machine its landing gear is provided with brake appliances by which it can be stopped after a short landing run, thus allowing it to alight on limited landing areas. It is particularly important that these machines should have a low landing spread and a good landing controllability.

Great importance is attached in all British airplanes to lateral maneuverability. They are therefore almost always provided with rudders both on the top and bottom wings. The above-mentioned machine is also furnished with double rudders. The preference accorded by the English to a very large size of rudders is due to the importance which they attach to the capacity for side-slip landing.

ARTILLERY AND FIRE PROTECTION

The problem of protection from fire and artillery calls for especial attention in all types of army airplanes. The question of artillery protection has already been mentioned. It consists in measures tending to minimize the probability that the airplane will fall in consequence of a hit. The so-called main vital parts, namely, the spars, wing struts, supporting wires, etc., are those which involve the greatest danger to the airplane if they are hit. Any damage to these parts must inevitably lead to the fall of the airplane. The secondary vital parts are the steerage members, rudder hinges, suspension cables, and other parts which are usually present in pairs; the loss of one of these members will not prevent the airplane from performing a smooth descent in case of necessity. The main parts of the landing gear should also be reckoned in this second category. A hit in the propeller is usually disastrous if the latter flies asunder, because it will probably cause the motor to be torn out of its bearings.

These dangers having been fully recognized abroad, a special type has been evolved for infantry and battle airplanes, which are most exposed to attacks from land artillery. It is supposed that a wing construction with a supporting covering and a light timber or metal fuselage will furnish the greatest resistance against hits. These constructions, however, are difficult to repair, especially in the case of timber fuselage.

ARMOR PLATING

The safety of the fliers from enemy fire can be obtained by means of armor plating, but this involves an increase of weight, which can only be afforded by moderate flight requirements. This is the reason why armor plating is only adopted in airplanes designed for action in land batteries, for which high-climbing performances are not an indispensable requisite. French construction regulations provide for the possibility of fitting armor-plated seats into each military airplane. The weight of the armored seat for each of the fliers is estimated at 50 kg. We think it doubtful, however, whether the problematic efficiency of such a seat plating should be preferred to the economy of 50 kg. in weight and the consequent increase of flight performance, especially in a pursuit airplane. Besides, seat plating would not afford protection to any vital part of the machine; the French, however, seem to attach great importance to that particular point.

FIRE PROTECTION

On the other hand, the question of security against fire is one of the highest importance for army airplanes. Fires on a flying airplane may be due to three causes: Motor damages leading to an ignition of the carburetor; self-ignition of material, such as munition, etc.; bombardment by the enemy with explosive or burning missiles. From our military technical standpoint we are only concerned with the latter contingency; in that case protection will consist in measures designed to prevent the fuel escaping from a pierced tank from catching fire on the surface of or inside the airplane. Facilities must be provided for emptying out the whole supply of benzine from a burning airplane within the shortest space of time and without incurring extra risks. It should be borne in mind that fire on an airplane always begins by ignition of the benzine; it never starts from any part of the airplane itself, even should that part consist of wood or varnished fabric.

The widely prevalent opinion that metal airplanes are practically fireproof should consequently be regarded as erroneous. The only advantage of a metal airplane in case of fire is that metal parts are less liable to lose their form and solidity than wooden or fabric parts. But in the case of a severe fire on a flying airplane it will hardly ever be possible to effect a landing in time to save the inmates from being badly injured. There seems to be good reason to suppose that the advantages of metal airplanes in regard to fire safety have been greatly exaggerated. The source of danger lies in the fuel, to which may be added the lubricating oil.

Protection from fire arising from enemy bombardment must be obtained in the first place by a proper arrangement of the fuel system. This may be done in different ways. For instance, the fuel tank may be thrown overboard or it may be ripped open like a balloon, with the result that the fuel will pour out almost instantaneously. A more usual method of safety is the protected tank, whose special shape and rubber covering prevent the fuel from being set on fire by burning missiles. All the protective measures which could be effected in the construction of fuel tanks were applied by France and England during the war. The various safety types exemplified by the Imber and Lanser tanks have remained practically unaltered up to the present day and have been generally adopted. Every modern army airplane is furnished either with a detachable or a protected fuel tank.

A moderate degree of fire safety may be obtained by an adapted disposition of the tanks, but this method is not generally adopted by army airplanes. The disposition of the tanks produces an increase of head resistance and of the moment of mass inertia. Fok-

ker's system of storing the fuel in the landing-gear wing was excellent in theory, but he had to abandon it because the tank and its conductions got constantly damaged when landing, owing to their close vicinity to the ground. The storage of the whole fuel supply in a gravity tank is not possible with a powerful motor, nor would it be advisable from the standpoint of fire safety, although it unquestionably assures the greatest operative reliability. Pressure tanks have been abandoned in almost all army administrations.

Further protective measures against fire are provided by fireproof partitions, protected fuel conductions, and a safe discharge of tankage fuel.

It would lead us too far to treat of fire protection in cases of breakage or carburetor fires. These are questions which call for most careful attention, especially with regard to our sporting and traffic airplanes, and which have unfortunately been considerably neglected.

PROTECTION OF FLIERS IN CASES OF BREAKAGE

Adequate safety measures for the personnel is an imperative requirement in army-airplane construction. It is an unquestionable fact that the loss of an efficient personnel is much more difficult to repair than loss or damage to material parts. Especial care has therefore been accorded in all countries to an adequate protection of the personnel of military aircraft. The question of the safety of the fliers in cases of breakage is one which has been much discussed but which has not been sufficiently attended to in the construction of most airplane types. A certain degree of safety is afforded by the so-called "appointed breaking places" in the framework, which are designed to prevent those parts of the machine which are hard to replace or whose breakage would involve danger to the inmates from being exposed to excessive stress occasioned by hard landing or other reasons. For instance, it is not advisable to connect the landing gear too firmly with the fuselage, because in case of a violent shock when landing it is better that the landing gear should break off than that the airplane should be turned over or be otherwise badly injured and the life of the occupants endangered. The measurements which should be applied to these "breaking places" can not be determined by any rules; the question must be solved by the intuition of the engineer, and up to the present time a right solution is mainly a matter of good luck.

There is, however, one principle which should always be followed and which we find set down in the old German rules for the construction of army airplanes, namely, the consolidation of the sitting places. If the airplane is well built, a heavy fall may cause

the fuselage to break in front of or behind the cabin; but it should never break near the cockpits where the latter form an interruption in the framework. No heavy objects, such as tanks, etc., should be placed behind the sitting places. The result following upon a strict adherence to this principle of airplane construction are shown on photograph 13 (not shown). It represents a Dornier *Falken*, which was heavily injured by a fall occasioned by a damage in the wing. The fuselage was broken in front of and behind the cabin, but the latter remained completely intact. The flier owed his life to the solidity of the cabin and the fact that the fuselage at his back did not contain any heavy weight. He fell from a height of 50 m., with the result that the airplane was completely shattered, whereas he escaped with a slight concussion of the brain and a broken leg. A similar accident incurred by a foreign pursuit single seater would undoubtedly have had much more disastrous results for the inmates. The fact that the efficiency of the personnel is strongly dependent upon their confidence in their machine should be sufficient reason to accord greater care to this point than has been done until now.

DISASSEMBLAGE

The problem of disassemblage has attracted considerable attention abroad. There is a strong tendency in England to have the greatest possible number of army airplanes furnished with folding wings. This is probably being done with a view to avoiding the difficulties attending the ship transportation of braced airplanes and their housing in chance shelters, these being possibilities which may have to be reckoned with in future. The construction of folding wings does not present any obstacles of a novel sort. It involves an increase of weight and additional work for the building engineer, but it does not offer any fundamental difficulties. In biplanes the rear spar connection near the cockpit usually serves as pivot.

THE LANDING GEAR

Several interesting points may be noted in the development of the landing gear. Toward the end of the war there was a general tendency toward the adoption of a unified normal type of landing gear; instead of which we see an increasing variety of types prevailing at the present time. The British were the first to introduce the use of shock absorbers. They started from the viewpoint that the dangerous rebound of the machine induced by hard landings and uneven landing surfaces could be obviated by the application of organs which would absorb a certain quantity of the momentum, i. e., transform it into another form of energy. These organs would

take the place of the former spring which, strictly speaking, was not designed to absorb momentum.

The shock can be most effectually absorbed by the internal friction of liquids and semielastic substances. A rubber spring is much more effective than a steel one because its action is not one of pure resiliency, but includes the absorption of momentum due to the internal friction of the rubber. The British generally use shock absorbers containing a body of air surrounded by oil. The momentum is absorbed by the compression of the air and the internal friction of the viscus oil. The French Hartfort shock absorber consists of two friction disks revolving in opposite directions against each other. This efficient and easily adaptable shock absorber is worthy of notice.

The prevalent tendency in the construction of the landing gear is the greatest possible reduction of head resistance. The external normal springs of the landing gear offer a considerable head resistance in addition to that offered by the wheels; it therefore seems advisable to house them in the wheel itself. The elastic wheel of the new Curtiss racing airplane offers a construction whose efficiency has been proved by its success in high-speed competitions. The fixed hub has a diameter of almost 40 centimeters, and contains an internal normal rubber spring. The circumference of the wheel is comparatively small. In the Dornier *Falken* the whole arm of the landing gear is made to swing in a spring inside the fuselage, which takes the place of the external spring. The new Curtiss PWS, pursuit single-seater has a somewhat different arrangement based upon the same principle; special spring struts connect the wheel axis stump with a rubber spring in the opposite wall of the fuselage. It is notable that the rubber is drawn out instead of being compressed as it usually is and that the single rubber plates can easily be replaced. The rubber is very sensitive to exposure to low temperatures, as is the case during long flights at high altitudes. It is therefore absolutely indispensable that the rubber springs in pursuit planes be easily replaceable.

Both last-mentioned landing gear differ from from the usual type by the absence of a transversal axis. The adoption of a divided landing gear in large airplanes is based upon the necessity of having a free path for dropping missiles, especially torpedoes. In spite of the difficulties offered by the construction of divided landing gear in small airplanes, the advocation of that method by the American air forces has led to its adoption in England as well as in America. It is founded upon the supposition that the elimination of the transversal axis and of the accompanying stiffenings must improve the landing efficiency on snow and uneven ground.

The wheels offer a high air resistance which can only be slightly reduced by appropriate coverings or in-drawing of the wheels. Coverings, however, have not been generally adopted, neither are Army airplanes adapted for drawing in the wheels. Folding landing gear is as yet only used in racing airplanes, but the difficulties offered by its construction prevent its general adoption even in the latter machines.

COOLERS

The construction of the coolers plays a special part in the reduction of the head resistance produced by high flight speeds. Lamblin's ingeniously contrived tank cooler was generally adopted by all up-to-date airplanes during two years after the war. Its superiority consisted not only in its low head resistance as compared with the usual heavily built French coolers, but especially in its light weight and the great facility of installment. It did not, however, fully justify the expectations which it had aroused. Its deficiencies may have been due in many cases to an imperfect installment, its cooling action being greatly dependent upon the flow of the cooling water. Its original awkward shape was subsequently superseded by innovations and improvements which, however, retained the main feature of the Lamblin cooler, namely, the thin radial ribs through which the water flows in a strong swirl, giving off its warmth to the outside air through the medium of the thin, heat-conducting sheet-iron wall. The conduction of the cooling air is such as to obviate fluctuations of the outside airflow within or near the cooling ribs. The disadvantage of this cooler consists in its having to be installed as low as possible in order to obtain a sufficient whirling flow of the cooling water, with the result that if it is damaged by a hit the whole water supply runs dry. This deficiency may be partially remedied by small additional reservoirs in the cylinder coverings above the water level, which have the advantage of allowing for the expansion of the heated water and the possible production of steam. These coolers are hard to repair.

The supporting surface cooler is a remarkable innovation introduced by Curtiss in 1922 and which is not to be confounded with Seppler's wing cooler. It may be termed an ideal cooler in so far as its head resistance is practically nil. Its fundamental idea is very simple. Two corrugated sheets of brass are laid upon the wing covering so as to allow the cooling water to circulate between them along their corrugations. The collecting tubes for the supply and escape of the water are disposed within the wing. The brass sheets must be of appropriate softness. Supporting surface coolers are most efficient when disposed on the upper surface of the wing and

especially along its leading edge; but they are usually disposed on both the upper and the under surface and are furnished with common collecting tubes. It is advisable to run the tubes along one of the spars. A strong motor requires a comparatively large cooling surface, but it is possible to obtain a sufficient surface even in racing airplanes with very small supporting planes and a 500-horsepower motor. The cooler is made of separate elements of a breadth of 30 to 60 centimeters, which facilitate the shutting off of leaking parts. For starting the motor in cold weather the inner-lying elements are used first in order to raise the cooling water to the most favorable temperature in the shortest time. This type of cooler is built in France as well as in America, the French Moureux cooler resembling the Curtiss cooler with the difference that the single cooling sheets are connected with each other by a novel folding, In England, Fairey has purchased the right of copying the Curtiss cooler.

The supporting surface cooler has not been generally adopted by army airplane construction in view of its great vulnerability in case of a hit. As yet it has only been applied in the Curtiss pursuit airplane, which is the most up-to-date and recently introduced type of military airplane. It possesses the unquestionable advantage of increasing the flight performances owing to the considerable reduction of head resistance. Its operative reliability has until now proved completely satisfactory.

A similar type of cooler was suggested long ago by R. Wagner as a condenser for his airplane steam-turbine plants. His idea seems to have been a development of Hiram Maxim's attempt to adapt part of the wings as a condenser for his steam airplanes.

PROPELLERS

Airplane construction has been greatly improved of late by the introduction of a new type of propeller. There has been a marked tendency for many years toward the creation of an efficient metallic propeller, but quite independently from all the work done in that direction, the American engineer Reed struck upon the idea of an entirely novel type of propeller. He was investigating acoustic problems with the object of elaborating the draft of a siren and, while studying the usual types of siren wings, he came to the conclusion that it ought to be possible to obtain good results with elastic air propellers with a circumference speed exceeding the velocity of sound. Presumably Reed was ignorant of the fact that this viewpoint was in complete contradiction to the universally accepted opinion that a high efficiency of the propeller could only be obtained by keeping its circumference speed well below the velocity of sound.

This generally established opinion had been confirmed by experiments with propellers whose speed exceeded sound velocity (supersound-velocity propellers) made by British air experts shortly after the war. Reed's propeller was therefore regarded with great skepticism by professional air circles. Its construction was based upon certain new viewpoints which furnished a hitherto unknown explanation of the fact that the results of Reed's experiments contradicted the generally prevailing opinion on high-circumference-speed propellers.

Reed's propeller is remarkably simple. It consists of a thin sheet of duraluminum with sharpened edges, twisted toward both sides in accordance with the pitch and mounted in a divided hub. The thinness of the blade cross sections is such as could never have been attained with wooden propellers; the blades themselves are so flexible that they can be bent with the hand, and they only acquire rigidity from the pull of the centrifugal forces. This nonrigid propeller type bears a certain resemblance to that of Maj. V. Parseval. The extreme thinness of the blade sections is the indispensable condition which permits the attainment of a favorable aerodynamic efficiency in spite of a circumference speed equal to or exceeding the velocity of sound. The results furnished by American experiments in high-speed wind tunnels (wind speed 400 kil./h.) proved extremely useful by providing evidence of the advantages offered by thin profiles in very high velocities. The increase of efficiency obtained by the Reed propeller is equal to 6 per cent.

The Reed propeller permits the running of high-speed motors without reduction gearing. The increase in the number of revolutions thereby obtained allow a reduction of the diameter of the propeller, which offers certain constructive advantages. The propeller-jet section which plays an important part in the resistance conditions of the airplane is reduced but its rate of speed increases with an equal thrust; this again entails an increased effect of the fuselage resistances. The elasticity of the Reed propeller insures its better adaptability to the motor. All these advantages offered by the Reed propeller, added to the easiness of this construction, are of the great possible value for the construction of army airplanes, although its price is higher than that of usual wooden propellers.

England (Fairey) and France (Levasseur) have purchased the right of building a similar type of propeller from the patent holders, Curtis Airplane & Motor Works.

The results obtained on trial flights have exceeded the highest expectations. All the American speed records during the last two years have been obtained exclusively with the Reed propeller. The flight performances of airplanes with reduction-geared motors im-

proved very considerably after they had been furnished with duralumin propellers. It is probable that army airplane construction will soon adopt Reed's invention.

Adjustable propellers.—Propellers with a variable pitch are an absolute necessity for airplanes with altitude motors, and the problem is being investigated in all countries. No satisfactory solution has yet been found offering sufficient operative reliability combined with satisfactory simplicity. But it has been generally recognized that the first step toward the realization of the adjustable propeller must necessarily be the metal propeller. This latter, however, has not yet been evolved in a form fitting it for adoption in the military airplane construction, with the exception of the Reed propeller, which is based on quite different principles. Experiments with variable-pitch propellers are being made by Micarts (United States), Leitner-Watts (England) and Levasseur (France). The blades of the Micarts are made of bands of fabric saturated with resin and pressed. This type is expensive, but it has been proved by experience to be as good and even better than the wooden propeller.

ARMAMENT

The armament of army airplanes has not altered in any essential particulars since the war. Now as then it consists mainly in air-cooled machine guns belonging to the well-known systems of Vickers, Lewis, Browning, Colt, Marlin, Hotchkiss, Thompson, etc.

The constructive development of the machine gun shows a tendency toward an increase of caliber, which pursues the object of efficient action against tanks and plate armor rather than that of improvement of the ballistic qualities. The fire speed has not been much increased. The caliber has risen from 7.65 millimeters to 11 and 12.7 millimeters. The installation of machine guns may either be a rigid or a movable one. The rigid machine gun shoots through the propeller and must therefore be furnished with a regulating apparatus which only allows a shot to be fired at the moment when there is no blade in front of the barrel opening. This is obtained by means of a special machine-gun gearing first made in Germany. The United States use the Nelson gearing, which requires the guns to be modified for single firing, whereas England and France use the Constantinesco system and its variations. Numerous trials have been made with electric machine-gun gearing.

A new type originally evolved in Germany is the motor gun, which is entirely operated by the motor, in distinction from the usual type, which is only regulated by the motor, while its shooting and loading are effected by gas pressure, i. e., by the recoil.

The installment of rigid machine guns is attended with certain difficulties especially when the pilot sits immediately behind the motor. The former German method is still regarded abroad as exemplary. The well-known German central control of rigid guns is also so far superior in quality that it has not yet been adequately copied abroad nor has it been replaced by any other system. The operative reliability of its flexible shafts is, however, far from perfect. It must be taken into consideration that the number of propeller revolutions has increased considerably of late years and that the introduction of four-blade propellers adds perceptibly to the difficulty of machine-gun control.

The French method of gun installment is generally regarded as unsatisfactory because it lacks the necessary rigidity.

The adequate cooling of the guns requires especial attention. The barrels should be surrounded as much as possible by a free flow of air. At great altitudes, on the other hand, the movable lock mechanism must be provided with a heating apparatus; but this is only necessary with movable machine guns. The barrel of the English Vickers machine gun is furnished with special aluminum cooling ribs. The cooling of the barrel is especially important in cases of action against land forces, because this latter generally involves prolonged firing.

Movable machine guns.—The type of movable machine guns generally adopted since the war is that of double-barreled or coupled twin guns mounted on a flexible mount. Considerable effort is needed to move the gun in the flexible mount during flight. The wind pressure on a twin Lewis machine gun in a *DH–4* biplane with a Liberty motor amounts to 35 kg. At high speeds it exceeds the physical strength of the operator, so that experiments are being made abroad for the adaptation of balancing appliances. As yet, however, no satisfactory results have been obtained.

Action against land targets is effected by means of guns installed in the fuselage and pointing slantingly downwards. The Americans have endeavored to increase the battle efficiency of their airplanes by furnishing them with the greatest possible number of guns. The so-called Larsen monoplane—a traffic airplane which has been rebuilt in an inefficient manner so as to serve as battle airplane—was furnished with no less than 32 machine guns. The "Boeing" *GA–X* armored triplane has 8 guns, whose operation must require the three fliers to develop the activity of jazz-band players.

The use of light guns for airplanes has spread considerably since the war, especially in the United States, where preference is given to a movable method of installment. Another method is that of the so-called "cannon single-seaters," in which the guns are installed in front, and operated by a perfected Hispano-Suiza "cannon" motor.

The gun fires through the hollow propeller hub, this effect being obtained by driving the propeller by means of a gearing connected with the crank shaft. It should be noted that this motor was used with great success during the war in armed single-seaters by French fliers, such as Guynemer and others. These single-seaters were fitted with 37 millimeter guns, and were especially designed for fighting submarines. They are hardly used in France at present.

The usual calibers for airplane guns are 20 and 37 millimeters. The Wright "cannon" motor, which is an improved Hispano-Suiza "cannon," is used with the 37-millimeter semiautomatic Baldwin airplane gun. The same gun has been installed movably by way of experiment on Martin two-motor airplanes. The projectile weighs 500 gr. and is furnished with a percussion fuse.

Similar experiments are being made with 75 and 76.5 Davies guns. The distinctive feature of the latter is that it has no recoil. The cartrige weighs 6.7 kg., and consists of a sheath open at both ends, one end containing the projectile and the other a blind charge; the driving charge lies between the two. The recoil from the shot is balanced by the simultaneous ejection of the blind charge. The barrel tube of the gun is open at both ends, the charging mechanism being situated in the middle. The projectile and the blind charge are ejected from the opposite ends of the barrel with equal momentum. The disadvantage of this gun is its limited firing angle, resulting from the necessity of having a free firing field in both directions. Experiments made with this American gun have apparently given satisfactory results, but it has not yet been introduced.

The installment of machine guns in the floor of the fuselage for action against land targets is not new, but a novel development is offered by their being mounted in a flexible mount. The American method consists in installing two coupled machine guns in a flexible mount in the floor of the fuselage; they are expected to furnish a rate of fire of 2,400 shots per minute. These guns are especially designed for defense against tail attacks in air battles. They have been adopted in the majority of French Army airplanes. We have as yet no adequate experimental data as to the efficiency of machine guns with such a high firing speed, but there is reason to believe that they do not at present furnish anything like the same reliability as the ordinary machine gun.

The firebrand is an air weapon which is being constantly experimented with, but which has never been adopted by military air technique. No country has ever introduced firebrand airplanes into its air forces, and the results of German experiments during the war justify the conclusion that the firebrand will never acquire any importance as an aerial weapon.

Gas is a much more effectual weapon of aerial warfare, which will in the future offer a wide field for the activities of army airplanes. An investigation of the technical qualities of the gas weapon from the standpoint of air technique would, however, lead us far out of the limits of this article.

We have only endeavored to give a short account of the technical development of the army airplane abroad, and to touch upon a few modern problems as far as this could be done in an open publication.

Our country is debarred from all possibility of entertaining air forces or of developing her technical powers in that sphere. It should be quite clearly recognized by every German that this circumstance must more or less completely paralyze our military efficiency, because no country can effectually defend itself in our present days without an adequate aerial force. The future will show whether the political wisdom of our enemies was not so faulty when they reduced us to the state of defenseless impotency.

Army airplane construction offers a number of technical problems and a wide field for technical improvements which are of the highest interest for aviation and airplane construction in general. This ought to be sufficient reason to induce German airplane engineers to take at least a theoretical interest in the problems of army airplane construction, in spite of the inactivity to which they are condemned by the enemy's "definitions."

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FOR CONVENIENCE IN ROUTING

Officer	Initials	Date received	Date forwarded
Captain			
Executive Officer			
Gunnery Officer			
Navigation Officer			
First Lieutenant			
Engineer Officer			
Asst. F. C. Officer			
Communication Officer			
Medical Officer			
Supply Officer			
First Division Officer			
Second Division Officer			
Third Division Officer			
Fourth Division Officer			
Fifth Division Officer			
Sixth Division Officer			
Marine Officer			
"V" Division Officer			
"A" Division Officer			
"B" Division Officer			
"E" Division Officer			
"M" Division Officer			
"N" Division Officer			
"R" Division Officer			
Radio Officer			

The material for the BULLETIN is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

NOTICE

The contents of this number of the BULLETIN are based upon information received in the Office of Naval Intelligence between August 25 and September 23, inclusive.

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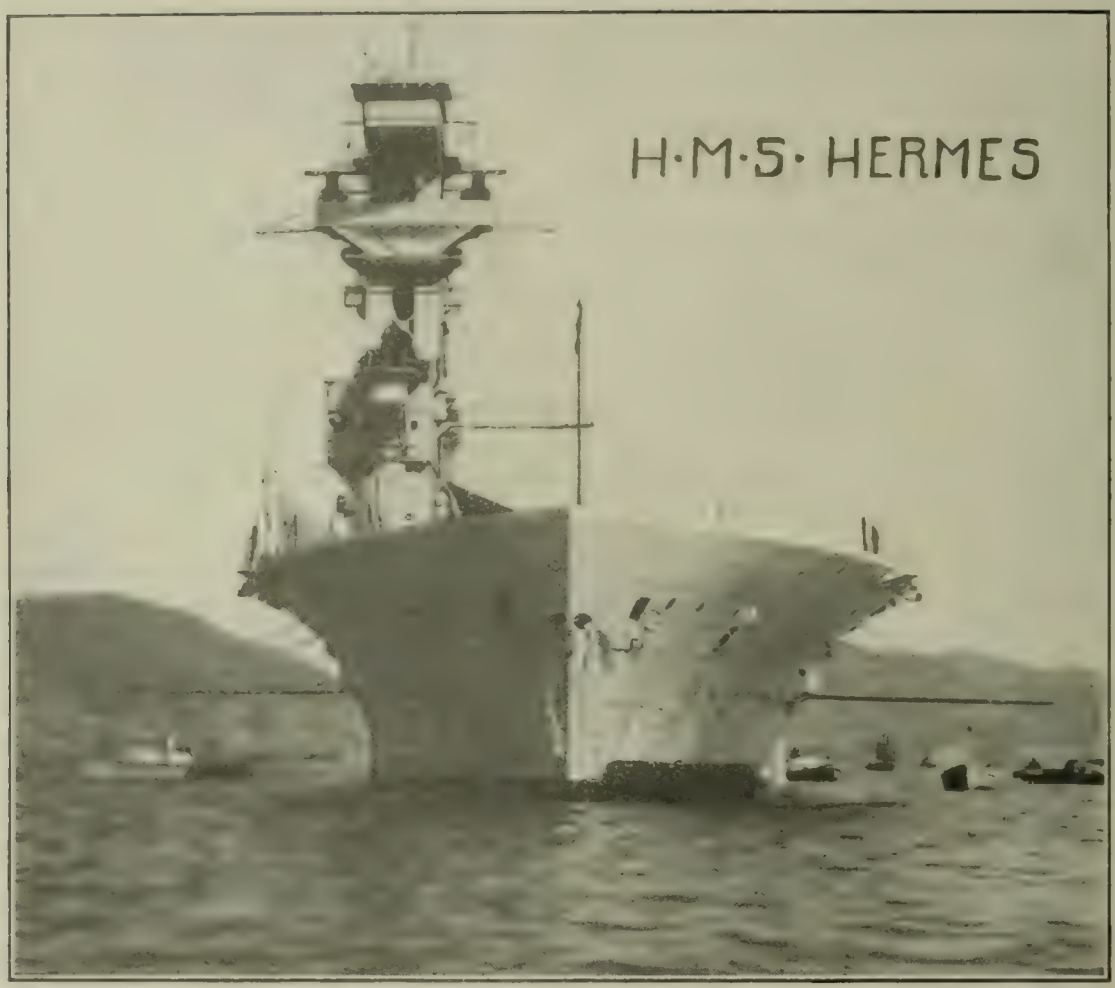
H·M·S· HERMES

CONFIDENTIAL

O. N. I. MONTHLY INFORMATION BULLETIN

VOL. IX OCTOBER, 1926 No. 4

BRAZIL

A. NAVAL

1. Naval aviation school regulations.

Decree 17,354 gives regulations for the aviation school of the navy for the purpose of: Preparing officers of the Brazilian Navy for general aviation service of the navy; preparing civilians, for the same service, who will constitute a reserve force; instructing petty officers in the Brazilian Navy to act as pilots and mechanics; instructing enlisted men in aviation in order that they may intelligently cooperate with the aviation arm of the navy.

The aviation school will be directly under the Director of Aviation at the aviation center in Rio de Janeiro.

Teaching will be given as outlined in regulations and as approved by the Minister of Marine.

Discipline at the aviation school will be the same as in any other department of the navy.

The school will function whenever the minister deems necessary; the first course will be initiated in February, 1927, unless the date is changed by the Minister.

Personnel for the school will consist of a director, an assistant director, a principal or general professor of teaching, secretary, instructors and assistant instructors, a technician, a designer, and two civilian professors for primary teaching of subordinate personnel.

The different duties of the above are given in the decree, and for the course of navy aviators there will only be admitted: Capitães tenentes (lieutenants) under 30 years of age of the active list; primeiro tenentes (lieutenants, junior grade) of less than 30 years of age, after finishing one cruise; civilians under 30 years of age, who make application, to go into the naval reserves.

For the course of naval aviation pilots: Petty officers of less than 30 years of age.

For the course of naval aviation mechanics: Petty officers from the technical departments of the navy who qualify.

Examinations are to be held to show qualifications of the personnel.

4. Under these regulations officers and civilians may be naval aviators and petty officers, aviation pilots and aviation mechanics.

The courses for naval aviators and aviation pilots will be divided into two parts—theoretical and practical. Diplomas will be given in both courses. Rules are given on how examinations will be held.

The pay will be the same as in the regular line duty of the navy, except that flying time pay will be added according to rules promulgated by the Minister of Marine.

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2. *Brazilian shipyards offered to Argentina.*

[Source: Consular report]

It is reported that the Brazilian Government has offered to Argentina, through the medium of the embassy of the latter country, the services of the shipyards of Vianna Island, situated in the Bay of Rio de Janeiro, which are the property of the Brazilian Coastwise Navigation Co.

It is said that the Brazilian cruiser *Bahia* was completely overhauled and modernized in the said yards with such satisfactory results that on leaving drydock she made a trial voyage to New York which was accomplished in 12 days, arriving in perfect condition.

Several of the merchant ships plying between Argentina and Brazil have been built in the shipyards of Vianna Island.

CHILE

A. NAVAL

1. *Maneuvers of the active fleet during August.*

[Source: Chilean press]

All the necessary measures for carrying out the naval maneuvers which will be held between the 10th and 20th of the present month have been completed and all instructions covering same having been imparted to the commander in chief of the fleet, the units of which are now in the bay at Puerto Aldea.

The general staff submitted to the director general of the navy, for approval, the plan of the exercises. This plan, as is natural, and the results of these exercises, will be kept in the most absolute secrecy, save those general details which it is not impracticable to divulge to the general public.

According to our information, the exercises will begin as soon as the transport *Angamos*, the coal ship for all the units of the fleet, is provisioned with coal, for which purpose it is now at Lota.

The units of the fleet which are to participate in the exercises will leave their harbor at Puerto Aldea on the night of the 9th of the present month and put out to the high sea to begin to carry out the tactical program at dawn of the 10th instant. The exercises will be conducted for eight days on the high sea between Valparaiso and Coquimbo. The development of the whole plan takes into consideration scouting, attacks, etc.

While we have not been so officially informed, it is understood that a small fleet of submarines, now harbored at the naval base at Talcahuano, will take part in these maneuvers at a stated time. These ships will develop a special plan which has been designated to them in the program for placing themselves at a moment's notice at the orders of the commander in chief of the fleet.

The aviation branch of the navy will not be able to participate in these great exercises because of not having the necessary elements and equipment with which to execute its mission.

Before the ships depart from Puerto Aldea, the British naval technicians will go aboard for the purpose of making such observations and criticisms as they may have gleaned from the lessons learned during the World War. The following English Navy men will embark as advisors to the general staff: Capt. George Creswell and Commander George Sandwith, the latter also a specialist in radio communications and signal corps work.

Upon completion of the maneuvers the fleet will return to Quintero in order to commence target practice, which probably will be witnessed by the director general of the navy. The director general of the navy (Vice Admiral don Juan Schroder) will review the ships of the fleet in the bay at Quintero and make the critique of the maneuvers.

NOTE.—The above seems to confirm the report that "naval aviation in Chile is now at a standstill, due to lack of equipment."

In an edition of August 5 of the same paper it is stated that these maneuvers will be witnessed by several senators and diputados of the committee designated to study the question of the renovation of the fleet, in order that they might see for themselves at first hand the exact condition of the units of the fleet so that they might be able to state with authority in the forthcoming sessions of Congress the exact state of the national defense.

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2. *Opinion of congressional committee on necessity for renovating the navy.*

Following is taken from El Mercurio (Santiago) of July 31, 1926:

The news that the committee of senators and diputados, charged with the securing of information as to the urgency and advantage of renovating our

material affair, had given a favorable verdict—only one dissenting vote—was a just cause for patriotic rejoicing in navy circles, rejoicing in which the public who is interested in our naval institutions will also participate.

This favorable information signifies a sure vote by both Houses of Congress for the amount of pounds sterling which is required to renovate the greater part of our old floating museum, because on this committee were legislators of all parties and all tendencies of both Houses of Congress, and necessarily this committee was charged to study the project in detail in order to save discussions in the sessions which will probably be convened for the purpose of deciding the matter.

The information, which we have obtained from authentic sources, indicates that in both Houses of Congress there exists a better feeling for this project because all of the members have been forced to see clearly that the situation of our country, almost disarmed on the sea, is imprudent, facing adversaries who, during the time that they continue to equip themselves, do not conceal the fact that such preparations are against us.

The above is interesting to note in view of the fact that hitherto the navy has not succeeded in getting any kind of a hearing or consideration from the present Congress as to its needs.

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3. Military and naval equipment.

[Source: Consular report]

According to information received, a bill is now before Congress, which is supported by both the army and the navy, appropriating approximately 3,500,000 pounds sterling for the purchase of equipment for both the army and navy. This equipment would consist of small arms, machine guns and ammunition therefor, Browning machine guns for the navy, airplanes for the army and navy, and field guns for the army.

It is reported that this bill has the approval of both committees of Congress and will probably be passed.

It is stated that some of the agents of arms companies in Santiago feel that the local German firms are making unusually strong bids for the contracts. These firms are stated to represent factories in Switzerland and Sweden.

CHINA

A. AERONAUTICAL

1. Review of aviation in China.

The pretentious and expensive efforts made, from time to time, to develop a national aviation department, controlling both military and commercial flying, have finally resulted in complete failure.

The whole organization, as outlined in previous editions of the Year Book, has ceased to exist, commercial aviation has been a pronounced failure, military aviation is entirely in the hands of the provinical militarist and Peking is without planes or men to fly them. The last of those which might have been considered the property of the Central Government (9 or 10 twin-engine Vickers-Vimy) are now in the possession of the Kuominchun at Kalgan.

The history of aviation in China begins with the exhibition flights at Shanghai in 1909, given by a French pilot named Vallon who was subsequently killed in a flying accident. The following year Chinese interest was further stimulated by flights over the Legation Quarter in Peking by a Russian in a Bleriot monoplane and in that year (1910) the general staff attempted to establish a small plant near Nanyuan for the manufacture of airplanes. Nothing of value was produced.

During the revolution in 1911 the southern leaders planned to attack Peking by air and purchased two Etrich monoplanes in Austria which did not arrive until the end of 1912 when they were put in charge of a British returned student, a Mr. Z. Y. Lee. During the same year an American returned student, Mr. Feng Yu, did exhibition flying over Canton but was killed in an accident.

In 1913 Mr. Lee, with his two Etrich planes, was moved to Nanking and then to the Nanyuan field where Tsao Kun was then garrison commander. Interest in flying was greatly stimulated by Mr. Lee's arrival and General Tsao Kun, through Vice President Li Yuan-hung, then acting chief of staff to Yuan Shih-kai, raised $300,000 for the purchase of 12 Caudron biplanes and the equipment of workshops and a school. Two French and two Chinese instructors, and two French mechanics, were employed. During the Great War supplies were difficult to obtain and there was no increase in equipment, but about 100 student pilots were graduated from the school and the planes saw a little service in the White Wolf and Mongolian expeditions, while one was used in July, 1919, in a most spectacular fashion to bomb the Imperial Palace during the Chang Hsun restoration.

In 1916 experiments commenced at Foochow in the manufacture of airplanes, but were discouraged by the collapse of a machine because of engine trouble while in flight and were finally abandoned about 1921.

In 1919 the Chinese Government signed contracts with the Handley-Page Co., for the purchase of six large passenger planes and with Vickers for 40 Vickers-Vimy commercial planes, 40 Vimy training machines and for 65 Avro planes. At this time some of the Caudron biplanes purchased in 1913 were still in service. Group Capt. F. V. Holt, C. M. G., D. O. S., was borrowed from the British

Air Ministry and employed as adviser to the aeronautical department. British, American and French instructors with war experience were employed, as well as a number of expert mechanics. The school at Nanyuan took on a flourishing aspect in 1920 and elaborate schemes were propounded for the development of a commercial air service along all of China's principal trade routes.

In the autumn of 1919 there were two aeronautical departments, one commercial, the other military, the former under General Tinge Shih-yuan, the latter under General Ting Chin (Mouhan K. Tinn). During the fighting, in the summer of 1920, between the Anfu Government and Wu Pei-fu, the two services were amalgamated under Tinge Shih-yuan for military purposes and all the available planes were used for observations and bombing. Immedicately after the defeat of the Anfu Government the Handley-Page machines were divided between the victors and carried off to Mukden and Paoting. Mukden also got two chasers of the *S. E. 5* type which had been ordered by the Tuchun of Honan but had been seized in Peking. Fortunately for the Central Government the Vickers-Vimy machines were not then delivered or assembled, so that when they did arrive the Nanyuan school was more handsomely equipped than ever. To rob the reorganized aeronautical department of its military character (the planes were all purchased "for commercial purposes"), a presidential mandate of February 9, 1921, made it an independent institution responsible to the Cabinet and not to the Ministry of War. Canton began in 1921, by devious means, to obtain Curtiss planes and to develop its own aviation department, while Mukden and Paotingfu each developed a school and aerodrome of its own. In February, 1921, after the Italian flight to the Orient, one of the Italian machines was presented to the Peking Government. In the summer of the same year an attempt was made to inaugurate a Peking-Shanghai air mail service and some flights were actually made to Tsinanfu in Shantung. A passenger and mail service to Peitaiho was also opened and continued to function with some interruption until the end of the summer of 1924 since when it has been abandoned.

In the spring of 1922, after the Fengtien-Chihli war, aviation began to go into a decline. As in 1920, a number of the planes were taken from Peking by the victors. Group Captain Holt resigned and went home, as did the majority of the foreign instructors. Petty politics and nepotism had crept into the aviation school and the students were undisciplined and inefficient. In 1924 a good proportion of the planes were wrecked or ruined and the Kuominchun, after Wu Pei-fu's collapse, had little left to play with. Since the evacuation of Peking by Lu Yung-hsiang in April 1926, when

the last of the Vickers-Vimy planes were taken to Kalgan, there has been no aeronautical department.

The Provinces, notably Fengtien, have developed their own aviation departments. The Mukden school has employed instructors of various nationalities in the past. At present M. Poulet, well known as an endurance flier before the Great War, is now adviser, while four Russian instructors and one Japanese are employed. In the past three years Chang Tso-lin has purchased about 150 planes from various French firms, of which perhaps 80 are left, besides which he still has the four British planes taken from Peking in 1920. Of these, 40 are new Schreck seaplanes ("amphibian") and are divided between Mukden and Hulutao. The others are Caudron and Brequet.

In Tsinanfu, Gen. Chang Chung-chang is now erecting what will probably be the largest aerodrome in China and has recently purchased six Potez-Anzini (75 C. V.) machines. He employs one French and two Japanese instructors.

In Nanking, Gen. Sun Chuan-fang has two or three Caudron machines and four Brequets, all captured in October and November, 1925, from the Manchurian armies in Kiangsu.

In Kalgan, as has been stated, the Kuominchun has 9 or 10 Vimy-Vickers planes. It is estimated that there are still in China 20 of these planes in various hands and perhaps 60 of the original Rolls-Royce engines in working order.

In Yunnanfu, Gen. Tang Chi-yao has 10 Caudron and Brequet planes. A French captain on active service acts as aviation adviser to the Yunnan Government and two French pilots, as well as a number of Annamite machinists, are employed. Only two Brequet and one Caudron is used, others under repairs.

In Taiyuanfu (Shansi), Gov. Yen Shih-shan has undertaken to build his own planes and latterly employed two German experts. The fruits of this undertaking have not yet been very encouraging.

In north China it is possible to account for about 140 planes in actual flying condition. In south China, including Yunnan, there are probably 30 more, including 10 Curtiss JN. Besides these the Navy is credited with 12 seaplanes. A few planes are privately owned by foreigners, although one estimate from a reliable source runs as high as 240. The standard British engine in use is the Rolls-Royce. The French planes are equipped with Mon-Souplage, Anzini, and, in the case of the new Schreck seaplanes, Hispano-Suiza engines. Also Lorraine engines in some Potez planes..

Foreigners who have had experience in the training of Chinese pilots agree that they are clever, level-headed, and courageous flyers. As mechanics the Chinese are careless and inaccurate except under

very close supervision. From a military point of view the Chinese pilot of the type so far turned out is far from satisfactory. Discipline among them is conspicuously lacking. Their numbers are so few that they are able to regard themselves as privileged persons and fly when and where they like. Over a field of battle they show a disposition to fly much too high for accurate observation, and during the campaigns of 1924, 1925, and 1926 their target practice with bombs has been absurdly inaccurate. They show no inclination for aerial combat or the use of armed planes against land forces and are much opposed to the introduction of such tactics. In fact, machine guns have only been mounted at the Mukden aerodrome and only in practice there.

The aviators have a guild or fraternity and have agreed not to fight each other, which makes the development of machine-gun tactics impossible.

B. MISCELLANEOUS

1. Chinese arsenals and arms.

The following information in regard to Chinese arms and arsenals was received from Chinese sources, fairly reliable. As a result of 15 years' successive civil wars in China, many kinds of modern arms and ammunitions have been imported from foreign countries and manufactured by Chinese arsenals at home. The following is a brief sketch of the arms and ammunition situation in China to-day:

Infantry rifles.—The most popular infantry rifles in the Chinese armies are (1) German rifles, 6.5 mm.; (2) 30th and 38th year Minchih (Japanese) rifles; (3) 6.5 Mauser rifles of 6.8 bore, manufactured at the Shanghai, Hanyang, Kunghsien, and the Canton Arsenals; (4) 1888 Mauser rifles of 6.9 bore, manufactured at the Canton and Hanyang Arsenals; (5) 20th and 28th year Minchih 7.9 mm. Japanese rifles; (6) old-style Japanese 7.9 mm. rifles, and (7) Russian rifles.

Machine guns used in China are mostly imported from Japan and Germany. Field guns and cannons are manufactured in Shanghai, Canton, Hanyang, and Kunghsien Arsenals after European models, and are generally of 75 centimeters. The largest cannons are those at the Min River fort of Foochow. They are very old but still perfect. There are plenty of projectiles to go with them.

Arsenals.—Chinese arsenals that are directly under the jurisdiction of the Central Government are those located at Hanyang in Hupeh Province, Tehchow in Shantung, the Kiangnan Arsenal of Shanghai, the Honan Arsenal located at Kunghsien, and the Shansi Arsenal located at Taiyuanfu. There are many small factories in the various provinces manufacturing gunpowder and miscellaneous arms and ammunition for local use that do not come under the control of the Ministry of War, including the Mukden Arsenal, the Changsha Arsenal, and the Canton Arsenal. The conditions of the various arsenals in China are as follows:

Tehchow Arsenal.—This arsenal uses old English machines that were formerly used at the East Arsenal of Tientsin. They are from 15 to 25 years old. The output of the arsenal is limited to rifles and artillery ammunition.

Tsinanfu Arsenal.—This arsenal uses British and German machines about 15 years old, employing 700 workmen and produces cartridges and machine guns; but the steel body of the guns is furnished by the Kiangnan Arsenal of Shanghai.

Taiyuanfu Arsenal.—Rebuilt and enlarged in 1924 and produces large cannons, field guns, artillery ammunition, rifles, and revolvers.

Kaifengfu Arsenal.—Employs 400 men, uses British, German, and Chinese machines and produces 8,000 cartridges, two or three rifles and one pistol every day, and one machine gun each month.

Kunghsien Arsenal.—This is a large arsenal. It employs 800 men and produces guns of 75 mm.

Hanyang Arsenal.—Employs 5,000 men, uses British, German, American, and Chinese machines; owns a smokeless-powder plant and produces 2,000 Mauser rifles, 20 pistols of the Mauser type, and 200 bayonets per day, and 500,000 cartridges per week and 5 machine guns per month.

Nanking Arsenal.—This is a small arsenal which employs 400 men and produces 120 rifles, 1,200,000 cartridges, and 4 machine guns per month. The machines used at this arsenal are all of German manufacture.

Changsha Arsenal.—This arsenal does nothing but repairs. It employs 400 men and repairs two or three machine guns and 40 to 50 rifles per day.

Foochow Arsenal.—This is the largest naval arsenal which produces one 7-centimeter cannon every 15 days, one 7.5-centimeter cannon every 45 days, and 10 machine guns and 3 rifles every day.

Canton Arsenal.—This arsenal used to manufacture arms and ammunition with American and German machines, but four years ago it was enlarged with American machines to enable it to produce 700,000 cartridges per month, 25 rifles per day, and 8 machine guns and some revolvers per month. It also produces smokeless gunpowder.

CZECHOSLOVAKIA

A. AERONAUTICAL

1. Contract for planes with Skoda.

According to the management of the Skoda Works in Prague, they have received an order for 25 all-metal airplane bodies from the ministry of national defense of the Czechoslovak Government.

The order specifies that the material must be duraluminum. The construction used will be that of the "Devoitine" type, the license for which was obtained by the Skoda Works from the French patent holders. The contract calls for delivery of the planes before the end of the year 1927. Additional details of the contract were not obtainable.

According to the informant it is the first order for all-metal planes which has been placed by the ministry of national defense. It is

also the first large order for flying equipment which this Government has placed with the Skoda Works.

NOTE.—The Skoda Works in Prague were before the war extensive manufacturers of military and naval requirements in steel. They built the large siege guns which were so effective in the reduction of the fortifications of Antwerp and Namur.—Ed.

DENMARK

A. NAVAL

1. Annual exercises.

Rear Admiral Amdrup will shortly hoist his flag on one of the coast defense ships and the Danish Navy will have their annual exercises at sea which will last about eight weeks. Ordinarily the ships are laid up out of commission or for repairs with just enough personnel for maintenance.

In Denmark six months' conscriptive service is obligatory, and a certain proportion of the men conscripted are assigned for naval service. A part of this service consists of this eight weeks' annual cruise. This year there will take part one coast defense ship, two cruisers, and a number of torpedo vessels and mine layers. Cruising is done in home waters, and enough ships are put into commission to take charge of the training of the conscripts. After the annual exercises are completed the ships are again laid up at navy yards out of commission or for repairs. The limited naval budget does not permit keeping any ships in commission except as stated.

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2. Completion of submarines.

Information is received that the first of the new submarines will not be completed until October.

NOTE.—These boats are of 325/380 tons and speeds of 16/9 knots. There are two in this class building at Copenhagen, and their completion has been considerably delayed.—Ed.

ESTHONIA

A. NAVAL

1. Naval activities.

[Source: Consular report]

Gen. Maj. N. Reek, chief of the general staff, and Capt. H. Salza, commander of the navy, conducted an official inspection of the Es-

thonian Baltic Naval Division, on July 21. The press states that both were satisfied with conditions and found the navy to be in good shape.

Following the example of previous years, the Esthonian authorities hope to be able to send some of the younger naval officers to England this year where, with the permission of the British Admiralty, they will undergo a course of naval studies.

Mention was made in the local press during the month of Latvia's having increased the number of its naval fleet by two submarines, of 450 registered tons each, and two trawlers of 250 registered tons each. In view of the fact that Latvia appears to be the only one of the Baltic States in possession of modern U-boats, there is every reason for this country to rejoice in the acquisition, adds the Esthonian press.

FINLAND

A. NAVAL

1. Submarine construction.

[Source: M. I. D.]

The contract for submarines has not yet been awarded. It seems to have narrowed down to a serious consideration of only two bids, the German bid for construction at Abo, and the American bid for construction at Sandvikens (Helsingfors).

The following changes have been made in the specifications and drawings have been submitted by all firms:

It has been decided to use the 100-ton submarine only for torpedoes, and the mine-laying feature for this boat has been eliminated.

The demountable ways for mines on the top of the after part of the hull of the 400-ton boat have been superseded by attachments for mines at the sides of the hull.

NOTE.—The Finnish building program and the specifications for the submarines to be built were given in last month's BULLETIN. Briefly, 2 submarines are to be begun in 1926—1 of 400-tons and 1 of 100; 2 400-ton boats in 1927; and 2 gunboats in 1928.—Ed.

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2. Naval personnel in service.

Naval (line) officers		38
Engineers		15
Naval cadets		34
Conscripts	approx	800
Volunteers (principally petty officers)	approx	250

B. MILITARY

1. Coast defense system.

[Source: M. I. D.]

The following units comprise the Finnish coast defense forces:

First coast artillery regiment; headquarters, Helsingfors (Sveaborg).
Second coast artillery regiment; headquarters, Kotka.
Third coast artillery regiment; headquarters, Sortavala.
Special coast artillery battalion; headquarters, Hango.

Complete information covering the coast defense organization is being gathered piecemeal, inasmuch as all the data of the sort and in the form desired is not available at army headquarters. The material herewith covers details of the organization of the second regiment, more especially of the second battalion of the regiment, acquired by visit of inspection to the second battalion, stationed on the islands near Viborg. Similar information will subsequently be forwarded on the first and third regiments, and the special battalion.

The 6-inch (152-mm.) Russian Canet 45-caliber guns (C 6/45) are of the same type used by Esthonia and Latvia: model 1904, manufactured chiefly in 1904 and 1905, both in Russia (Pehm and Oboukhov), and by Schneider in France; range 13,000 meters. There were a great many of these guns made for the Russian coast defenses, for their serial numbers run high. (One of the guns at Tuppuri is No. 102, 1904.) These guns are very satisfactory in performance. At effective ranges they are expected to bracket the target in 3 to 5 shots, with a range error of not more than 100 meters and a very slight deflection error. There is a large supply of old war-time ammunition on hand for these guns in good condition. The war-time type of shell weighs 42.10 kilograms; a new type "ballistic" shell weighs 48.20 kilograms.

The Perm 3-inch Canet model 1914 antiaircraft gun is likewise a most satisfactory weapon. Range, 52 cables (9,500 meters, approximately). It may be used both for antiaircraft and for flat trajectory firing. The workmanship of the tubing of this gun is exceptionally good.

The Hotchkiss 57-mm. 58 caliber gun (H 57/58) is a Q. F. weapon for use against small craft running close inshore. Effective range, 4,000 meters, with a maximum range error of 100 meters, and a deflection error of 0, at the same range. (Very excellent results in target practice have been secured with this gun.)

The 6-inch 35-caliber model 1880 naval guns are an obsolete type and were installed by the Russians many years ago. They are fairly

good guns and shoot accurately, but the 10,000-meter range is too short; ammunition supply is limited; there is no 6-inch 35-caliber ammunition on Tuppuri and a small supply only for the battery at Härkola.

NOTES CONCERNING BATTERIES

Ravansaari.—The battery can fire to protect Tuppuri and can cover the area east of Teikarsaari (north of Tuppuri), shown on the chart, which is ideal as an anchorage for a large naval force, having served during the World War as a concentration anchorage of the Russian battle fleet. The guns are so sighted that they can easily fire (direct fire) on Viborg. They have a 360° traverse, but their principal line of fire (indirect fire) is southwest. They may be used for indirect fire only to the south and southwest; direct fire is limited to the direction of Viborg. The battery has only two guns, but emplacements are prepared for four more of the same type.

Tuppuri.—The 6-inch battery protects the main entrance to Viborg Harbor from the southwest (between Rondo and the Edvardsgrund beacon; the main channel here is very deep); it can fire also to protect the exit of Bjorkosund, 360° traverse, open emplacements.

The 3-inch antiaircraft battery, if used as a flat trajectory battery, can cover the same sector, but with a range shorter by 3,500 meters. When firing flat trajectory it could be used only as a secondary battery.

The Hotchkiss battery is sighted to fire southwest.

The 6-inch 35-caliber battery is of practically no value. It could fire to the northeast only, using indirect fire; but it is not seriously considered as useful.

Harkola.—This battery of old guns is sighted so that it can protect the passage through Bjorkosund. It can fire (indirect) over Peisaari, and when laid west can just reach the main channel.

In the event of a Russian naval attack on Viborg, red destroyers would probably be sent through Bjorkosund. The larger units of the Baltic fleet would doubtless move on Viborg by a course lying to the west of Bjorko-Torssaari-Peisaari, and would bombard the city and forts from a point beyond the range of the coast guns. The Finnish staff calculates the Russian destroyers steaming in company would arrive off Tuppuri in from 4½ to 5 hours from the time of their departure from Kronstadt; this would mean a cruising speed of about 18 knots. It is believed that one or two of the destroyer units can steam in company at about 30 knots, but all de-

stroyers can not maintain this speed. Russian airplanes would be expected to be over Viborg in something less than an hour from their departure from the airdrome near Leningrad. It is almost certain that the first Russian attack would come on the forts of the third battalion on Bjorko and on the eastern shore of the entrance to Bjorkosund at Humaljoki (south of Humaljoenlati). Note that the Russians have a project for development of a secondary naval base and an aviation base at Luga, due south of Viborg. Naval and air forces operating from this base would have a much shorter distance to travel.

The coast fortifications in Lake Ladoga are installed as a protection against a possible raid of Russian destroyers against Kexholm and Sortavala. There are no Russian warships of the size of destroyers in Ladoga, but they could be easily brought from the Baltic through the Neva Canal at Leningrad. The depth of the lake, although shallow over most of its area, is such as to permit the operation of destroyers. Finland always feels a little nervous about its eastern flank at this point and conjures up bogeys about landings of Russian troops on the Karelian shore from large flat barges, all of which is quite improbable, but which nevertheless is responsible for the Finnish decision to construct a 100-ton submarine for service primarily in Ladoga. By treaty agreement neither Russia nor Finland can have a warship of more than 100 tons in Ladoga.

FRANCE

A. NAVAL

1. Trials of new light cruisers.

Comparative trial results of the three 8,000-ton light cruisers, *Duguay-Trouin*, *Lamotte-Picquet*, and *Primauguet* (all completed in 1925):

		Duguay-Trouin	Lamotte-Picquet	Primauguet
Speed attained per hour	knots	33.60	33.04	33.066
Power developed during six-hour run		116.235	115.100	116.849
Fuel consumption per hour	kilos	46.367	49.000	50.584
	tons	4,564	4,823	5,600
Endurance and fuel-consumption test of 24 hours at 30 knots (fuel consumption per standard mile)	kilos	804	820	825
	pounds	1,772	1,808	1,819
Fuel-consumption test of 8 hours, speed 15 knots (fuel consumption per standard mile)	kilos	804	820	825
	pounds	1,772	1,808	1,819
Distance over measured course, speed 20 knots per hour, steaming trials	miles	425	600	550

NOTE.—These ships were designed for 34.5 knots at 100,000 horsepower.—Ed.

2. *Comments on "Duguay-Trouin" class of cruisers.*

[Source: British press]

Few man-of-war types have been subjected to so much criticism as the 8,000-ton cruisers of the French *Primauguet* type, yet there is no doubt that they are well worthy of the careful attention of naval architects, now that every navy is realizing that the cost of the 10,000-ton *Washington* class is excessive and that it will be essential to devise a rather smaller and considerably cheaper type that will be able to undertake the majority of their duties and act as auxiliaries to them. It has been said that the 6.1-inch high-velocity gun with which these ships are fitted is too light for the work, but it is a masterpiece of French ingenuity, and it must not be forgotten that at the Battle of the Falklands and elsewhere the German high-velocity 4.1-incher outranged the British 6-incher and contrived to do very considerable damage. The use of the 6.1-incher avoids the very easy fault of overgunning a ship which is built primarily for speed, and in the matter of speed the French ships appear to be satisfactory. They were designed with four sets of Parsons geared turbines, developing 100,000 s. h. p. and fed by eight Guyot boilers. The designed speed was at least 34 knots, and many unofficial estimates have been published about their being good for 36 knots. The trials were carried out with different propellers and the most successful is being fitted to all three. These appear to give them all over 34 knots, while, as there is always a suspicion that continental cruisers are underboilered and therefore unable to maintain a high speed for long periods, it may be mentioned that that *Primauguet* steamed 30 knots for over 26 hours at half power.

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3. *Submarine exhaust valves.*

The exhaust valves of Diesel motors for French submarines are of two types:

1. The interior valves which have a wedged-shaped disk with a double seat, maneuvered by a square thread screw.

2. The exterior valves, of which the tightness is assured by a circular flap valve mounted on a hinge with a gasket of rubber. The flap valve which is operated from the interior of the vessel by means of a tangent screw and worm wheel has its water-tightness reinforced by the pressure of the water against it as in the case of a water-tight door. In the open position the flap valve falls back in a case where the circulating water of the motors pass. The gasket of rubber of the flap valve is thus always wet.

Exterior valves of the same type as the interior valves—that is, with a wedge-shaped disk are also in use.

4. Itinerary of school ship "Jeanne d'Arc," 1926–27.

The cruiser *Jeanne d'Arc*, training ship for cadets, will get under way from Brest about October 11, 1926, for the annual training cruise.

The proposed itinerary of the *Jeanne d'Arc* is as follows:

Madeira	Oct. 16–Oct. 21.	Les Saintes	Jan. 4–Jan. 16.
Dakar	Oct. 26–Nov. 2.	Fort de France	Jan. 17–Jan. 24.
Fort de France	Nov. 13–Nov. 20.	Trinidad	Jan. 26–Feb. 1.
Kingston	Nov. 21–Dec. 1.	Cape Verde	Feb. 11–Feb. 12.
Guantanamo	Dec. 2–Dec. 6.	Dakar	Feb. 14–Feb. 21.
Port au Prince	Dec. 7–Dec. 13.	Laluz	Feb. 25–Mar. 2.
San Juan	Dec. 16–Dec. 22.	Agadir	Mar. 4–Mar. 5.
St. Thomas	Dec. 23–Dec. 29.	Malaga	Mar. 8–Mar. 13.
Basse Terre	Dec. 30–Jan. 1.	Toulon	Mar. 16.

B. AERONAUTICAL

1. Rigid airships.

It is understood from competent authority that the rigid airship *Mediterranee* (ex-German *Nordstern*), a Zeppelin of the late war type, turned over to the French Navy in accordance with the provisions of the Versailles treaty, will be placed out of commission and dismantled at the end of the year. This is the only rigid dirigible remaining in the French forces.

The naval program of October 9, 1922, provided for the construction of six rigid dirigibles, but the revised program approved on March 14, 1925, canceled this provision.

France has thus apparently abandoned the idea of building airships to accompany the fleet.

C. MISCELLANEOUS

1. French communication systems.

NOTE.—The following are extracts from a report of the French Senate Committee on Public Works relative to a bill for the completion of the French communication systems.—*Ed.*

THE DEFICIENCY OF OUR CABLES

It is a fact recognized by all that France does not have a cable policy. The inferior situation we are now in, in this respect, is another indisputable fact.

The French system of submarine cables is divided as follows:

(*a*) The State, represented by the Department of Posts and Telegraphs, operates in addition to a number of small coast cables of minor importance, seven Mediterranean lines connecting the mother

country with Algeria and Tunisia; parts of 63 Franco-English cables across the channel; and 2 large Atlantic cables running from Brest, one to Casablanca and Dakar, the other to Dakar direct, with extensions to our Eastern Africa and Equatorial Africa colonies.

The government also owns cables in the Indian Ocean and the Pacific; at Madagascar and Indo China (Touraine, Amoy, and Saigon, Borneo lines).

(*b*) Two private companies divide the remainder of the system between them.

The South American Cable Co. operates at Dakar two cables, landing one at Pernambuco (Brazil), the other at Conakry, Monrovia, and Grand Bassam (western Africa). The French Telegraph Cable Co. owns the trans-Atlantic cable from Brest to Cape Cod and several runners of average length connecting the French West Indies, Haiti, and Venezuela, and, in the Pacific Ocean, a cable connecting New Caledonia with Australia.

In order to form an idea of the comparative importance of this submarine cable system, there will be given the following figures: The world system being represented by 3,642 cables, measuring 633,000 kilometers, the share of France therein is only 126 cables measuring 66,000 kilometers—that is to say, one-tenth of the whole.

But these modest figures are still giving too favorable an idea of our system. Indeed, quite a portion of our cables making up our share have been idle for some years (Amoy cable and the South Caribbean system); others are antiquated, in poor working condition, or inadequate (our trans-Atlantic cable to the United States only answers one-third of the Franco-American requirements). Because of the proximity of the coast many have had a mediocre business (cables of west Africa). Finally, most of them have no direct connection with the mother country and are therefore tributaries of foreign systems, which is an impossible circumstance in point of speedy transmission of messages, to say nothing of the danger it means to the colonies that are thus isolated—Indo-China, Madagascar, New Caledonia, and Antilles—in case of political nearness of war.

To give a final touch to the picture a part of the system, that which is serving the West Indies, is practically winding up its business. A bill introduced in the Chamber of Deputies on May 29, 1925, authorizes the French Telegraph Cable companies to negotiate for the transfer of that system to American companies on account of the slight interest hereafter offered to France in lines that are not connected with the mother country, and the monopolies of which are about to expire.

We may see how insignificant is our system, which moreover is a poorly paying proposition, when compared with English and

American competitors. England through two powerful firms (Eastern and Western Telegraph companies), has wound around the world a grand net of cables—a splendid commercial venture—which connects the mother country, without break, with its immense empire, with China, and with the American States.

What the United States has done, although of a more recent date, is not less well done, at least in the two oceans that water its coast. Two companies controlling 13 great cables have rapidly brought into being three systems, the Trans-Atlantic, the Trans-American, and the Trans-Pacific.

As for Germany, when war broke out it had a system of cables which, on the strength of an understanding with the Netherlands, put it in a commanding position in the Far East with the Island of Yap as its center. It had also managed with the boldness and secrecy that are its own to connect Berlin with the United States and its African colonies by using for the first time for a political purpose the new invention of radiotelegraphy, which was just being put into practice.

THE BEGINNINGS OF RADIO TELEGRAPHY

The degree to which the navy and merchant marine of Germany, even before the breaking out of hostilities, took advantage of the information broadcast by the central station of Nauen to the United States and to the possessions in Tego and South and East Africa is well known.

France, where scientific wireless telegraphy was born, was far from being as ready as she ought in that respect, and if England had not put her system of cables at our disposal our colonies would have been kept in a state of complete isolation.

What cause can be ascribed to that lack of submarine cable system and delay in radio development which came near working so much damage? It might be sufficient simply to charge it to the weakening of the power to decide, which is holding back so many things in this country. The authors of the parliamentary reports, who have kept close to the question, have usually blamed and sometimes rather severely the course of the State in going unassisted, and systematically having declined the cooperation of private industry which gave such a remarkable development to the submarine cable systems of England, United States, and Germany; it should be noted with respect to cables that France is the only country which reserved for Government administration more than one-half of its system.

The war thunderclap stirred the spirit of decision and put a quietus on the rivalries. The Departments of War, Navy, and Posts came to an agreement for the building of four great colonial sta-

tions—Bamake, Brazzaville, Tananarive, and Saigon. Work was begun in 1917.

The colonies for their part did not stand inactive. Western Africa, Indo China, Madagascar, the West Indies, and the Oceanic establishments constructed with such material as they could procure and generally with the assistance of the navy, stations of small power intended only to reach either neighboring colonies or countries or more powerful stations in the interior or to furnish mariners with information.

It was proper to base administrative regulations upon the operation of the twofold agency that had been hastily started. That is what a decree of July 31, 1919, which may be said to be the charter of our colonial radiotelegraphy, provides for. It distributes it as follows: To the postal department it gives the basic stations in the mother country and the large intercolonial stations; to the colonial government, the local systems in existence or those to be created. On the other hand, the decree provides for departures from the principle, by agreements to be made among the departments concerned. An agreement of that kind transferred the Saigon station to the Indo-China Government, which operates it with the cooperation of the General Wireless Co.

Peace was concluded and the war-time ardor cooled off. The construction of the four great intercolonial stations was continued so slowly that the Saigon station, which was begun in 1917, was not put into operation until 1923, those at Bamako and Tananarive in 1925, and the Brazaville station is not yet in operation. The general plan outlined in 1912, again put forward in 1922, has not been completed. By means of small yearly appropriations in the budgets of the Colonies, Post and War Departments an attempt has been made to carry on this original plan. Furthermore, owing to financial conditions, it has become harder to get appropriations. Recourse to radiotelegraphy is nevertheless an absolute necessity for our country. France is not rich enough now to assume the enormous outlay required at this time for the restoration and completion of our cable system. On the other hand, wireless telegraphy may, at a much lower cost, take the place, in a great measure, of submarine cables. It even has an advantage over cables and it seems possible that it will some day supersede them entirely.

Furthermore, in following the example of other countries and going into partnership with private industry for international communications, our Government at least succeeded in removing the financial limitations which would surely have hampered the execution of a government radiotelegraphic system had it been politically possible to have one.

The convention of October 29, 1920, made with the Radio-France Co. had the advantage to put at the disposal of the Government an agency of high technical value.

Mr. Paul Laffont, deputy, formerly Undersecretary of State for Posts and Telegraphs, summed up as follows the meaning and scope of that convention:

> The convention does not carry any concession of a monopoly to the company. The Government still continues to be the compulsory medium between the company and the public. It sanctions the tariffs. It may eventually requisition the company's installations and operate them itself. It supervises all the operation, technical organization, administrative management, and financial operations. The State has a share in the profits. It supervises everything and takes no risk.

Thus, aided by the State, the company managed to elbow its way to a place in the world, notwithstanding the position already occupied by the following competitors: The English Marconi company, which owned three large stations in England, operating concessions in Canada, South Africa, Spain, Brazil, Colombia, a monopoly in Australia, concessions in Switzerland, and agreements in India; the Radio Corporation of America, which held an actual monopoly in the United States and had connections with England, Germany, Norway, Italy, and Japan, Central America and Hawaii; the Transradio Telefunken which, from its base at Nauen, communicated directly with South America and the Far East, and from Eilvese, with Spain and Czechoslovakia, and has equipped the Netherlands, the Dutch Indies, and the Argentine Republic.

The Radio-France Co. has established in Czechoslovakia a station with which it communicates; it constructed and operates a station in Belgrade under an official concession; one in Kovno, which it operates through its subsidiary, the Electric Radio; and one in Beirut, intrusted to another subsidiary, the Radio-Orient.

The French company has also fully or partially equipped Rumania, Belgium, Turkey, Italy, and Russia; altogether one-half of the big radio stations of the world. Finally it succeeded, through negotiations with the three large foreign companies above named, which are already strongly situated in South America, China, and Egypt, in obtaining an equal share of radio traffic in those countries.

Intercolonial System

The State of France owns four official broadcasting stations under State departments: Bordeaux-Lafayette, postal; Lyon, postal; Saint-Pierre-des-Corps, war; Tour Eiffel, war.

The receiving center at Villejuif is connected with our four broadcasting stations. The radio service between France and the colonies

is exclusively attended to by the Bordeaux-Lafayette station, which has been reserved for that purpose. In the colonies:

1. Three stations at Bamako, Tananarive, and Saigon, both send to and receive from France. The first two are operated by the mother country's administration of posts and telegraphs. The Saigon station, as has already been said, belongs to the Government of Indo-China, which operates it with the personnel of the General Wireless Co.

2. Ten stations, which only receive from France—Brazzaville, Cenakry, Dakar, Djibouti, Fort-de-France, Destrellan (Guadaloupe), Saint-Pierre-Miquelon, Saint-Denis de la Reunion, Grand Bassam. and Cotonou. Those stations, by reason of their weak power, can not attend to bilateral communication with France except through relay stations in the same country or neighboring countries. They are operated by the local governments under the supervision of the Ministry of the Colonies.

3. With respect to north Africa we may note that Morocco at the present is only connected with Bordeaux by the Rabat receiving station, but will soon be able to exchange bilateral traffic with France when the broadcasting stations which the postal service of the protectorate intends to establish are put in operation.

Tunis, which, owing to its financial condition, has hesitated about assuming the expense of a radio telegraphic station will, no doubt, follow that example.

Finally, experiments are to be made toward establishing between Algeria and France, by short waves, bilateral radiotelegraph service, which, hard to believe, is not yet in existence, notwithstanding the overtaxing of the cables.

4. We have referred to the local systems gradually created by the colonies according to technical advances and the resources of their budgets. There are not less than 67 such stations distributed among 12 colonies. The greater part of those colonies have only coastal stations intended to give information to ships and to maintain relations with the neighboring islands or the nearest foreign stations. Only the large possessions, west and equatorial Africa, Indo-China, and Madagascar, have constructed systems which reach neighboring countries, such as the Yunnan, and the Belgian Congo. In addition to these three large long-wave stations, there is a demand for four short-wave transmitting stations in the West Indies, Djibouti, Tahiti, and Nouvelle-Caledonie. I have noted that the stations intended for Tahiti and Djibouti are being tested by the War Department at Issy-les-Moulineaux. The postal service informs us that a station of the same kind is contemplated in Martinique.

Intelligent governments will get great experience and moral benefit from the multiplicity of easy radiotelegraphic communications

by allowing private persons, as was done in the United States, it seems, to join in the system. When developed in this way the local systems become auxiliaries, the tributaries of the large stations whose traffic will hence be enlarged.

JAPAN

A. NAVAL

1. Foremast of battleship "Hyuga" to undergo alterations.

[Source: Japanese press]

The foremast of the battleship *Hyuga* will be reconstructed similar to that of the *Nagato* and *Mutsu*. This work will be done at Kure Navy Yard, requiring about six months and to cost about Y50,000.

(*NOTE.—These masts are of the heavy heptapodal type.—Ed.*)

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2. Accident on board "Yamashiro."

According to the Japanese press, while the *Yamashiro* was engaged in target practice in Saiki Bay, a breech plug in one of her turret guns receded, seriously injuring one man and slightly injuring several others. The cause of the accident is unknown, but an ordnance officer from Kure Naval Station was sent to Saiki Bay to investigate.

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3. Cruiser "Naka" has engine trouble.

The cruiser *Naka*, while engaged in training in Saiki Bay with ships of the combined fleet, developed trouble with her engines and was forced to return to Kure for repairs, which are expected to take 20 days.

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4. Destroyer accidents.

While engaged in practice in Bungo Channel on July 26 a shell in a 12-cm. gun on board the destroyer *No. 6* exploded, tearing out the breech plug of the gun, and two men of the crew were seriously injured. The destroyer *No. 6* was forced to withdraw from the practice and proceeded to Kure.

Destroyer *No. 4*, while engaged in firing torpedoes on July 29, had one of her torpedoes explode and seriously injured two men. After the accident destroyer *No. 4* proceeded to Kure.

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5. Destroyer "Yayoi" (381 tons) sunk.

According to the Japanese press the destroyer *Yayoi* was sunk by torpedoes and bombs dropped by five airplanes off Okinoshima,

Bungo Channel, on August 11. Bombing began at 7 a. m. and continued until she was finally sunk at 11 a. m.

A previous attempt was made to sink the *Yayoi* and *Hatsuharu* on the nights of August 7 and 8. The two destroyers were towed to a point about 10,000 meters distant from the lighthouse on Midzuno-kojima in the Bungo Channel, Shikoku, on the night of August 7, and firing commenced at 10 p. m. by the *Nagato* and *Yamashiro* from a distance of 20,000 meters, the ships being guided in their firing by illuminating shells. Firing continued for two hours at the rate of 40 shots per hour but neither one of the two destroyers were hit. Firing was resumed on the night of August 8 by the cruisers *Sendai* and *Yura* from a distance of 14,000 meters, the firing continuing for three hours at the rate of 40 shots per hour, but the result was as unsatisfactory as on the preceding night. The *Hatsuharu* was towed back to Kure and will be used as a target in the grand maneuvers to be held next year.

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6. Destroyer "No. 40."

Destroyer *No. 40* was laid down at the Sasebo Navy Yard on August 12, 1926. It is expected to be completed by March, 1928.

NOTE.—"No. 40" will be of 1,445 tons, 34 knots speed, and will carry four 4.7-inch 45-caliber C. L. guns and six 21-inch torpedo tubes.—Ed.

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7. Submarine "I–63."

According to the Japanese press, submarine *I–63* was laid down at the Sasebo Navy Yard on August 12, 1926. The *I–63* is expected to be completed by March, 1928.

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8. Submarine "I–2."

Submarine *I–2* was placed in commission on July 26, 1926, and the following will comprise her officer personnel:

Duty	Rank
Commanding	Lieutenant commander.
Torpedo officer	Lieutenant.
Navigator	Do.
Ordered on board	Lieutenant (j. g.).
Chief engineer	Lieutenant commander (Eng.).
Ordered on board	Ensign (Eng.).

Press reports: Submarine *I–2*, which was constructed at Kawasaki Dock Yards, Kobe, was expected to be delivered to the navy on July 15; however, while undergoing official trials trouble developed with her engines and will cause a delay of 10 days in her being turned over to the navy. She will be assigned to the second fleet and will

participate in the fall maneuvers. The *I–3* will also be shortly completed.

NOTE.—"I–2" has a displacement of 1970/2400 tons, 20-knot speed, 1,800 horsepower submerged, cruising radius of 8,000 to 9,000 miles at 13 knots, and mounts two 4.7-inch guns and six 21-inch torpedo tubes.—Ed.

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9. Accident to submarine "I–51."

The submarine *I–51* while engaged in maneuvers in Bungo Channel on August 5 and while submerging, about 10 feet below the surface of the water trouble developed with her rudder and she assumed a vertical position sinking to a depth of 30 feet, where she remained 5 minutes. After desperate efforts on the part of her crew she was brought to the surface and returned to Kure Naval Station for repairs.

NOTE.—"I 51" is a four-engine single-hull boat, the only one of her class. Displacement, 1400/1800 tons; speed, 22/13.5 knots; surface horsepower of 5,200; mounting, one 5.5-inch gun and six 21-inch torpedo tubes.—Ed.

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10. High-speed motor boats for the Japanese Navy.

The following are translations from the Japanese press:

A high-speed motor boat, speed 40 knots, which was designed by the Thorncroft Works, England, was recently delivered to Kure Naval Station.

A motor boat designed from a German type has recently been built and is being tried out in Saiki Bay by the Fuso. The results have been so satisfactory that it has been decided to build a sufficient number of this type of boat to equip all ships in the navy from light cruisers up. The motor boat has a speed of 40 knots and has an arrangement for discharging a torpedo from her bow and also carries two machine guns. The special feature of the boat is that she is equipped with "Kitchin" type of rudder.

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11. Japanese naval personnel (as of July 1, 1926).

	Active service	First and second reserves	Merchant marine reserve
Officers	5,060	1,570	545
Special and warrant officers	2,643	1,062	287
Petty officers and men	68,338	40,388	407
Officers by branches:			
Executive	2,896	828	----------
Engineer	1,058	266	----------
Surgeon	427	222	----------
Apothecary	22	11	----------
Paymaster	419	176	----------
Constructor	65	27	----------
Constructor, engineer	31	12	----------
Ordnance	138	26	----------
Hydrographic	4	2	----------
Total	5,060	1,570	----------

During the last year it is noted that there have been increases as follows: Officers, 428; Special and warrant officers, 132; petty officers and men, 2,926.

The following information was compiled from the Japanese Navy Register, the register having been brought up to date as of July 1, 1926, and it is noted that all of the totals do not compare with list above.

[Figures in parenthesis indicate number who have received training in aviation]

	Admiral	Vice admiral	Rear admiral	Captain	Commander	Lieutenant commander	Lieutenant	Lieutenant (j. g.)	Ensign	Total
Executive	9	17	48	177	319(2)	525(29)	756(58)	430(22)	477	2,869
Engineer				46	106(2)	191(5)	293(28)	177(3)	200	1,051
Medical		1	3	28	45	67	144	71	45	404
Pharmacy				2	1	4	9	4	2	22
Paymaster		1	4	19	45	66	142	57	60	394
Construction		1	3	10	9	9	16	17		65
Construction engineer			2	2	3	3	14	8		32
Ordnance			3	4	11	26	64	28	1	137
Hydrographic				1	3					4
Total	9	20	63	289	542(4)	891(34)	1,438(86)	792(25)	785	4,987

B. AERONAUTICAL

1. Japanese Navy air program.

The Japanese Navy air program calls for 17 air companies by 1929–30, but yearly increases have not been made as originally planned due to financial conditions. For instance, in 1926–27 there was to be an increase of 2½ companies, but the budget provided for cnly one-half company. In 1927–28, according to the program, there will be an increase of 2½ companies, but, again, due to financial reasons this will be reduced to 1½ companies. In addition to the 17 companies by 1929–30, the navy had planned to increase another 11 companies by 1932–33, and the navy is much concerned as to how to carry out the two programs, and it is likely that the uncompleted part of the program will be made up during 1931–32 to 1932–33, at which time the auxiliary ship construction expenditure will be light and there will be some leeway for aviation expenditure.

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2. Modified "F–5" flying boat.

The following is a translation from the Japanese press on the subject:

The *F–5* flying boat, which was until recently considered a good machine, has since the introduction of the duralamin machine fallen into disuse and their construction has been suspended.

Recently, however, a modified *F–5* was built by the Hiro Airplane Works embodying some of the features of a metal plane on a wood-made plane, and flying tests will be conducted in September.

The improvements effected in the modified *T 5* are as follows:

(a) Speed has been increased 100 to 150 miles compared to 60 to 70 of the old *T 5*.

(b) Area of wing has been decreased to make plane lighter.

(c) Increased thickness of wings.

(d) To reduce air resistance, the number of struts supporting wings will be reduced.

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3. *Bombing of forts in Hiroshima Bay.*

The following is a translation from the Japanese press:

Kojima Fort, which guards the passage through Kurushima Straits between the Province of Hiroshima and Province of Iyo, was recently abandoned, due to changes in the inland-sea defenses, and this fort was used as a target for the airplanes of the army and navy, the attacks starting on August 15.

The dropping of explosives on the fort commenced from the army (Tachikawa Aerodrome) side at 8.28 a. m., August 15. The first army plane, *Tei–2*, dropped two bombs which failed to hit; the next plane, *Tei–5*, also dropped two bombs, and one hit the breastworks. At 10 a. m. the same date a 1924 navy plane left Hiroshima and dropped three bombs on the fort. Two of the bombs missed the target, but the third bomb hit in the center of the fortress and shattered important works. One of the bombs which missed the target fell into the forest, causing a fire, and the bombing was suspended until the afternoon. In the afternoon the navy machines *No. 236* and *No. 334* each dropped several bombs and destroyed important parts of the fort.

August 16: In the morning army plane Tei type *No. 2* dropped three 50-kilogram bombs. Two of the bombs dropped on the seashore while the third hit a magazine and blew it up. Plane *No. 13* of the army dropped three bombs, none of which took effect, atmospheric conditions being unfavorable. Navy planes *336*, *334*, and *330* flew over the fort in formation about 15 meters apart and dropped two bombs each. Atmospheric conditions were favorable, and the six bombs dropped all took effect, destroying gun platforms and wire entanglements. In the afternoon army plane Tei type *No. 7* took up the bombing, dropping three bombs, all of them dropping in the rear of the fort. Navy planes *No. 336* and *334* dropped some more bombs in the afternoon, destroying batteries Nos. 1 and 2; thus all of the four batteries of the Kojima forts was destroyed by the navy.

August 17: Weather condition was unfavorable, army planes *13* and *7* engaged in bombing, *No. 13* dropped three 100-kilogram bombs, one dropping 20 meters back of a battery, another on the shore, and the third hit the breastworks of battery No. 4. *No. 7* plane dropped three 100-kilogram bombs, two of them dropping 30 meters from the breastworks and the third dropping on a wire fence.

August 20: Army Tei type *No. 13* dropped two bombs, the first bomb (100-kilogram) hit between the second and third battery, the second bomb (200-kilogram hit between the first and second batteries. The third bomb could not be dropped on account of releasing gear getting out of order. In the afternoon army Tei type *No. 13* dropped three 50-kilogram bombs all of which took effect on battery No. 1. Army plane Tei type *No. 7* dropped two 200-kilogram bombs both of which took effect.

Rear Admiral Ando, commanding Kasumigaura Naval Air Station, concerning the navy's part in the bombing remarked as follows:

"The main object of the recent bombing of the Kojima Fort was to test the destructive power of bombs, not much stress being laid on the height from which the bombs were dropped. The bombs were dropped from a height of 1,000 meters. As a result of the bombing the following information was obtained—

"(1) That air planes can carry a much heavier load of bombs than at present.

"(2) Stationary objects, especially forts like Kojima, can be destroyed in 20 minutes, providing the attacking planes are in formation and powerful explosives are used.

"(3) During the bombing the navy succeeded in attacking the fort in formation which is accompanied with great risk.

"(4) Succeeded in photographing the explosion of the bomb by means of automatic shutter which is operated by shock given by dropping of bombs.

"The official finding will be announced later but it is evident that the showing of the navy was exceptionally good. It is to be regretted that army could not have done equally as well but this was on account of air conditions."

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4. Cadets at naval academy to be instructed in aviation.

According to the Japanese press, the third-year cadets at the naval academy will be given a course of instruction in aviation in the future. The instruction will consist of lectures and these will be given at the Hiro Aviation Station.

It is also intended to impart aviation knowledge to some of the enlisted men. For this purpose various types of planes will be placed in the barracks of the various naval stations where recruits are being trained. Kure Naval Barracks has already received a scouting plane and this is being assembled.

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5. Aviation notes.

[Source: M. I. D.]

The 450-horsepower Hispano engined "Tiger" bomber adopted by the Kasumigaura Naval Air Group started its trial flight over Japan proper on the 25th of May. Operated by First-Class Pilot Nakao and carrying an engineer as passenger, it flew 725 kilometers from Kagamihahara to Omura in 3 hours 19 minutes in a heavy rain. From Omura to Morioka it covered the distance of 1,530 kilometers in 8 hours and 21 minutes without a stop; thus establishing a new record for an all-Japanese airplane. This machine is the largest horsepower ever made in Japan.

The *N–3* built in Italy for the Japanese Navy has successfully completed its trial flight there. This ship is of the type used by Amundsen on his recent polar expedition, though somewhat smaller. Early delivery in Japan is expected.

The Hikokai for July lists the following airplanes as being built by the Mitsubishi Motor Works:

For the navy.—(1) Mitsubishi ship combat plane (single-seater biplane); (2) Mitsubishi ship reconnaissance plane (two-seater biplane); (3) Mitsubishi ship attack plane (two-seater biplane); (4) Mitsubishi reconnaissance seaplane (two seater biplane).

For the Army.—(1) Mitsubishi school land plane (two-seater biplane of the Henriot type).

Experimental.—(1) Giant flying boat (all metal of the Rohrbach type); (2) bomber with metal-built main parts. These last two are not yet completed.

The naval authorities have announced their intention of submitting an estimate of 3,000,000 yen for the next budget to provide warships with airplanes. To date certain first-class cruisers have carried airplanes aboard experimentally. It is the plan of the Navy Department this year to provide capital ships and battle cruisers with three planes each, a scout plane, a fighter, and a reserve plane; light cruisers with two planes each; and gunboats of the Yagumo type with one plane.

The dirigible service is to be separated from the Kasumigaura naval air group and organized as an independent corps. The navy plans to organize the first dirigible group at Kasumigaura in 1927, and the second at Sasebo the following year, each group to consist of seven ships. The training course is to be lengthened from 4 to 6 months, to 10 months.

C. MILITARY

1. Coast fortifications.

[Source: M. I. D.]

Recent newspaper reports state that the fortress at Hiroshima is to be abandoned, to be replaced by a new fortress located at Kitsuki, north of Beppu. The new fortress will be known by the name of Hoyo Fortress (Kyushu-Shikoku Channel Fortress).

In army order No. 10, of March 29, 1923, announcement is made of the creation of a branch of the fortifications department, known as the Hoyo Branch, at Saganoseki Machi, Kita Amabe Gun, Oita Ken. This town is on a promontory on the south of Beppu, some 20 miles across Beppu Bay, from Kitsuki. Both places are in the announced prohibited zones.

A heavy gun believed to be of 16-inch caliber has recently been installed and tested in the Futsu Fortress at the entrance to Tokyo Bay (on Futsu Point across the bay from Yakosuka).

The press reports that this gun costs approximately a million yen and that similar guns will be completed by the end of next spring for installation in the newly created Hozo (Bungo-Shikoku) Fortress and in the Iki (Fukushima Channel) Fortress.

GERMANY

A. NAVAL

1. Launch of three new destroyers.

Three new destroyers were launched at Wilhelmshaven on July 18. Representatives of the military and naval government were present. The vessels were given the names *Greif*, *Seeadler* and *Albatros*.

NOTE.—These boats are of about 775 tons. Eight more are under construction.—Ed.

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2. New cruisers.

Newspaper reports state that the two new cruisers *B* and *C* now under construction at Wilhelmshaven and Kiel will be built according to the most modern principles and will represent a totally different type from the *Emden*. They will be very much longer and narrower than this vessel. Apart from the increased speed, the operative costs will also be very much less owing to the lesser resistance.

NOTE.—Cruiser "A," the "Emden," completed this year, displaces 6,000 metric tons, mounts ten 5.7-inch C. L. guns, four 23.6-inch torpedo tubes, and has a speed of about 29 knots.—Ed.

B. AERONAUTICAL

1. German-Franco air agreement.

NOTE.—There are given below extracts of the German-Franco commercial air agreement signed in Paris May 22, 1926, as being of interest in regard to the stipulations of such an instrument for international air commerce.—Ed.

(*a*) Each of the high contracting parties will accord to the aircraft of the other contracting party which is duly registered, freedom of passage over its territory in time of peace, provided that the terms of the present agreement are observed.

The establishment or operation by an aeronautical concern of one of the contracting parties of regular aircraft lines in or over the territory of the other contracting party (with or without landings) will be subject to a special agreement between the two countries.

(*b*) The aircraft belonging to one of the high contracting parties, together with their equipment and passengers, when over the territory of the other party will be subject to the national regulations of the State in question, especially with regard to the regulations concerning aerial navigation in general in so far as these apply to all foreign aircraft without distinction of nationality, especially as regards duty and other taxes, to exportation and importation restrictions, to the transportation of persons and merchandise, to safety,

and public order. They will also be subject to the other regulations and existing laws which are in force, in so far as this agreement does not make other provisions. The transportation of passengers or merchandise between two points in the territory of the State in question is reserved for the national aircraft.

(*c*) The two contracting parties may prohibit aerial navigation over certain territorial zones in so far as such prohibition affects both their own aircraft and that belonging to the other power. Each of the contracting countries must notify the other of the territorial zones over which aerial navigation is prohibited.

Furthermore, each of the contracting parties reserves the right to limit or prohibit temporarily, either in part or entirely, under exceptional circumstances, the same to go into effect immediately, aerial navigation over its territory on condition that there will be no distinction between the aircraft belonging to the other contracting party and that of all other foreign countries.

(*d*) Any machine which finds itself over such prohibited territory must immediately give the distress signal prescribed by the State in question; furthermore it should land as soon and as near as possible, at one of the aerodromes of such State.

(*e*) The machines must be furnished with distinctive markings which will be clearly visible which will make it possible to establish their nationality when in flight (marks showing nationality and registration). They should also carry the name and address of the owner.

The machines must be furnished with registration certificates and navigation certificates and all other documents prescribed for aerial navigation in their country of origin.

All the members of the crew who perform a special duty in the machine which is subject to a special authorization in their country of origin must be supplied with the papers prescribed in their country of origin for aerial navigation, especially diplomas and regular licenses.

The other members of the crew should be supplied with papers mentioning their occupation on board, their profession, their identity, their nationality.

The certificates of navigation, diplomas, and licenses delivered or recognized by one of the high contracting parties for the aircraft or crew are valid in the other state to the same extent as the documents delivered or recognized by the latter.

Each of the high contracting parties reserves the right to refuse to recognize for aerial navigation within its territories the diplomas (certificates of qualification) and licenses delivered to its nationals by the other contracting party.

The crew and the passengers, in so far as other arrangements are not made, must be furnished with papers of identity (passports) required by international traffic.

(*f*) Over the territory of the one contracting party, the aircraft of the other contracting party may only carry such wireless equipment as is permitted in the two contracting countries. Such apparatus may only be used by such members of the crew as are supplied with a special authorization delivered for this purpose by their country of origin.

For reasons of safety the two contracting countries reserve the right to issue regulations regarding the obligation of the aircraft to be supplied with wireless apparatus.

(*g*) The machines, their crew, and the passengers may not carry arms, ammunition, noxious gases, explosives, carrier pigeons, photographic apparatus, except with the authorization of the country over whose territory the machine is flying.

(*h*) Machines carrying passengers and merchandise must be supplied with a list of the passengers, and as far as the merchandise is concerned, with a manifest describing the nature and quantity of the cargo, as well as the necessary customs declarations.

If, upon the arrival of the machine, any discrepancy is found between the cargo and documents mentioned above, the customs authorities of the port of entry should communicate immediately with the competent customs authorities of the other contracting state.

The transportation of mail will be regulated directly by the postal authorities of the two contracting states by special agreement.

(*i*) In each case of departure or landing each contracting state may examine (search) the aircraft of the other contracting state, on its own territory by the competent authorities, and may also examine the certificates and other prescribed documents.

(*j*) The public aerodromes will be accessible to the machines of the two states. They may avail themselves of the meteorological service, the wireless communications, the signaling service by night and by day. The eventual taxes (landing tax, sojourn tax, etc.) will be the same as for the national aircraft of the country in question.

(*k*) For arrival and departure the aircraft destined for or coming from one of the contracting States may only proceed to or from a public aerodrome for public aerial navigation and classed as a customs aerodrome (with passport control service). There may be no intermediary landing between the frontier and the aerodrome. In special cases the competent authorities may authorize the departure or arrival at other aerodromes where the customs and pass-

port control will be effected. The prohibition of intermediary landings is also valid in these special cases.

In case of forced landings outside of the aerodromes, the commander of the machine, the crew, and the passengers must conform with the customs and passport regulations.

The two contracting parties must furnish a list of the aerodromes open to public aerial navigation. This list must designate those classed as customs aerodromes. Any alterations in this list, as well as any restrictions, even temporary, regarding the right to use one of these aerodromes, must be communicated immediately to the other contracting party.

(*l*) The frontiers common to the two contracting parties may not be crossed except at the points determined on by mutual agreement. The frontiers which are not common to both will be crossed at the points fixed by the two interested States.

Any zone in which one of the contracting parties authorizes the crossing of its frontiers (either common or otherwise) by its national aircraft or the aircraft of another nationality may be used ipso facto for the passage of the aircraft belonging to the other contracting party.

(*m*) Only fine sand and water may be discharged as ballast. While en route, outside of ballast, no other objects or matter may be thrown off or otherwise disposed of except with the special permission of the State over whose territory the aircraft may be.

(*n*) In questions of nationality in the execution of the present agreement, it is understood that the aircraft will have the nationality of the State on whose register it is listed.

(*o*) The two high contracting parties will exchange monthly lists of registrations and cancellations occurring on the register during the preceding month.

(*p*) Every aircraft passing over or entering the territory of one of the two States and only landing and stopping there when necessary may avoid confiscation for infringement of a patent or model by depositing bond, the amount of which in the failure of an amicable agreement is to be named as soon as possible by the competent authorities at the scene of seizure.

(*q*) The aircraft belonging to the two contracting states will be entitled, in case of emergency landings, to the same measures of assistance as the national aircraft.

The salvage of apparatus lost on the high sea, in the absence of contrary regulations, will be subject to the principles of maritime law made in international conventions, and in the absence of same to the national laws of the salvaging parties.

(*r*) The two high contracting parties will furnish each other with all the aeronautical regulations in force in their respective territories.

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2. Military and police aviation decrees.

In accordance with the protocol of signature of the Paris aeronautical agreements, the German Government has promulgated the following decrees.

TO THE REICHSWEHR (ARMY), BY THE MINISTER OF WAR

(*a*) All government offices as well as their personnel are forbidden to have any connection whatsoever with aviation for any military purpose running counter to the obligations contained in article 198 of the Versailles treaty. The measures necessary for the air defense from the ground do not come under this.

(*b*) The members of the Reichswehr are forbidden to train and engage in aviation, no matter of what kind, singly or in groups.

(*c*) Members of the Reichswehr may exceptionally and up to a certain limited number be allowed on their own application, privately and at their own cost, to learn and engage in sport flying. Applications to that effect are to be filed in the Ministry of the Reichswehr. The members of the Reichswehr are not granted for that purpose any subsidy or any special leave by any office, and neither can the sport flying of these members of the Reichswehr bear any military character or purpose. In cases of infringement of this clause the permission granted will be withdrawn.

TO THE CIVIL POLICE, BY THE MINISTER OF THE INTERIOR

Police officers are forbidden to train for and engage in aviation no matter what kind. As an exception, however, 50 police officers may train for aviation and hold aviation pilots' certificates.

These aviation pilots' certificates will not be issued to police officers to enable them to engage in aviation, but only for the purpose of acquiring the technical knowledge they must have in order to be able to supervise commercial aviation with a perfect knowledge of the conditions. For the rest, reference is made to paragraph 1 of the order concerning the restrictions on aviation training of July 13, 1926.

The 50 pilots' certificates so issued can only be superseded if the holder separates from the police force or reaches his forty-eighth year of age.

In the matter of selecting the 50 police officers who may be given aviation training, special instructions will be given to the various States.

Within the State the holders of aviation pilots' certificates are to be distributed among the several aviation fields.

For the rest, the duties laid upon the holders of aviation pilots' certificates in their capacity as police officers, undergo no change.

The police may not own any aircraft.

In Germany there can be no special police organization for aviation.

The police supervision of air traffic is to be carried out through police flying wardens who correspond to police game wardens.

Without prejudice to the special supervision of commercial aviation to be exercised by the above 50 police officers who hold the aviation pilots' certificates, police flying wardens who are on special duty at the aviation fields supervise the execution of the law and special orders in the same way as the police officers assigned for the supervision of other kinds of traffic carry out their orders.

C. MISCELLANEOUS

1. German use of artificial fog.

[Source: English press]

The Reichswehr maneuvers in the Weser Valley have come to an end after lasting a week. These are only a part of this year's German Army maneuvers. Two battalions of engineers and one battalion of infantry were engaged.

Artificial fog was used with great success. Valleys were concealed for hours by this fog, so that the movements of troops were made completely invisible to observers in airplanes.

GREAT BRITAIN

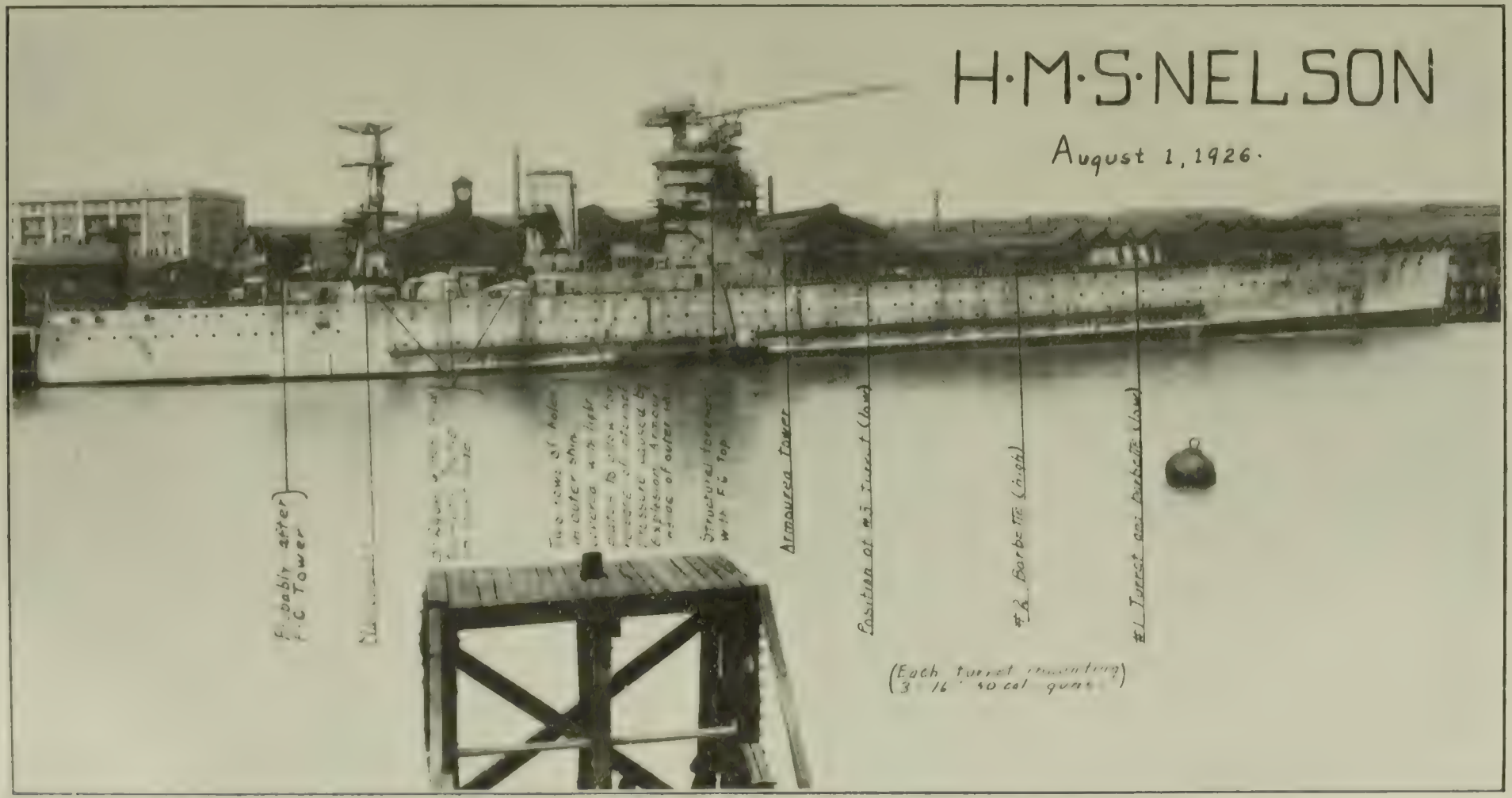
A. NAVAL

1. H. M. S. "Nelson" and "Rodney."

The photographs of H. M. S. *Nelson* show progress to August 1. Information from unofficial sources continues to assert that 14-inch and 7-inch vertical armor is used and 6-inch horizontal armor, as has been reported before.

A reliable source gives the turret armor as 14-inch in front tapering to 12-inch in back. A turret was seen at Armstrongs which

H·M·S·NELSON
August 1, 1926·


H·M·S·NELSON
August 1, 1926.
F. Rabbit after F.C Tower
Armoured tower
Position of #3 Turret (Aft)
#2 Barbette (Right)
#1 Turret and Barbette (Aft)
(Each turret mounting 3 16" 40 cal guns)

appeared to confirm these dimensions. The back of the turret seen is made of two plates which appeared to be full of 4-inch holes, alleged to be for "ventilation." Individual plates of the turret are keyed. It is understood the pre-war British battleships turrets had holes in the tops which were closed in during the war because of danger from high-angle fire and aircraft. (See attached sketch.)

On the occasion of a visit to the shipyard of Sir W. G. Armstrong, Whitworth & Co. (Ltd.), one of the turrets of the *Nelson* was seen from such an angle that the rear plates mentioned above were visible, though at a considerable distance. It seemed that several turret rear armor plates were fitted with apparently portable covering plates in the same positions as contained the large holes, which were distinctly visible in adjacent armor plates. This suggested that the holes might be for the purpose of releasing blast pressure in case of accident, which would be ample to blow off the light portable plates covering the holes. There is no confirmation of the real purpose of these holes as yet.

The attached sketch also gives the protection of turret substructure. This information is consistent with other information given on the sketch.

The bow is said by a reliable source to be protected by a turtleback as indicated by sketch. This is said to have been designed to prevent loss of speed if hit forward and to be a lesson from the Dogger Bank action.

At the works of Vickers (Ltd.), at Barrow-in-Furness, there were noted a number of armored hoods of unusual shape which have been built there for some part of the fire-control stations of the *Nelson* and *Rodney*. They are dome shaped and quite different from anything in our service. Vickers (Ltd.) builds all the director towers as well as the director systems for all British vessels of all types that are building. Vickers (Ltd.) and Sir W. G. Armstrong, Whitworth & Co. (Ltd.) usually divide equally the contracts for guns and gun mountings for all British ships. Consequently there is a large quantity of work of these two characters in hand at Vickers at present.

A reliable source gives the antiaircraft battery of the *Nelson* as six 4.7-inch, four 3-pounders, and four machine guns. Opinion is divided as to the merits of 3-pounders and it is possible the 3-pound battery may be increased. It is understood that Armstrongs have an admiralty order for twenty-four 50-caliber 4.7-inch antiaircraft guns and are negotiating for 78 more. These guns are being made in Armstrongs Italian factory to the designs of an Italian engineer which facilitate retubing. The *Nelson* design provides for two

antiaircraft guns abreast bridge, two abreast funnel, and two aft over steering engine.

It is understood from a reliable source that the *Nelson* has twin screws turning at 160 r. p. m., with a total of 52,000 surface horsepower for 23 knots. Steam pressure is 250 pounds, with 200° superheat from eight Yarrow boilers. Another source states the boiler plant consists of four "large" Yarrow boilers of 10,000 horsepower each, giving 40,000 surface horsepower for 22 knots. Since Yarrow makes a double-size boiler for destroyers, it is possible that the reports of four and of eight boilers for the *Nelson* refer to the same thing. In the *Ambuscade* there are two double boilers and one single of 14,000, 14,000, and 7,000 horsepower each (the small boiler for cruising). The 10,000-ton cruisers are understood to have eight Yarrow boilers rated at 10,000 horsepower each. It seems reasonable to conclude the *Nelson* has four similar boilers.

It is stated by a reliable source that the engine rooms are beneath the bridge structure, followed by the boiler rooms and then by the 6-inch magazines. The location of the engine rooms forward appears to be confirmed by the extraordinarily long shafting which was observed at Cammel Laird's yard at the time of the launching of the *Rodney*.

It was stated by an official of Vickers (Ltd.) that there will be a vast amount of hydroelectric machinery for various auxiliaries in the *Nelson* and *Rodney*, even searchlight training being accomplished by this system, as well as boat hoisting and the other more usual auxiliaries in which greater power is required.

It was stated by an official of the company that it was not expected that the *Nelson* would be ready for delivery before June 1, 1927, which seems reasonable from the appearance of the ship at present. He added that he felt sure that the *Rodney*, building at Birkenhead by Cammell Laird & Co. (Ltd.), would be materially later in delivery.

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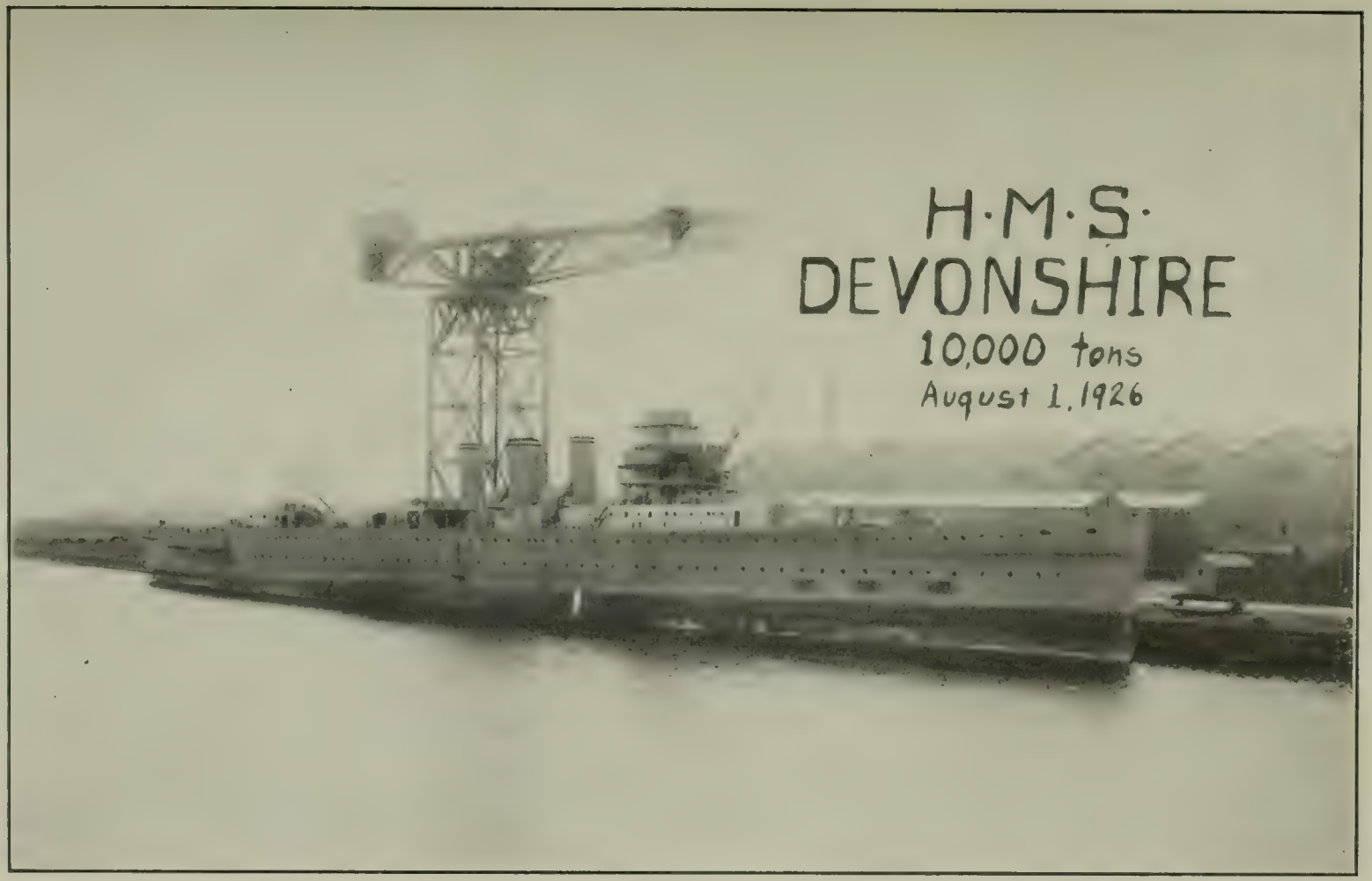
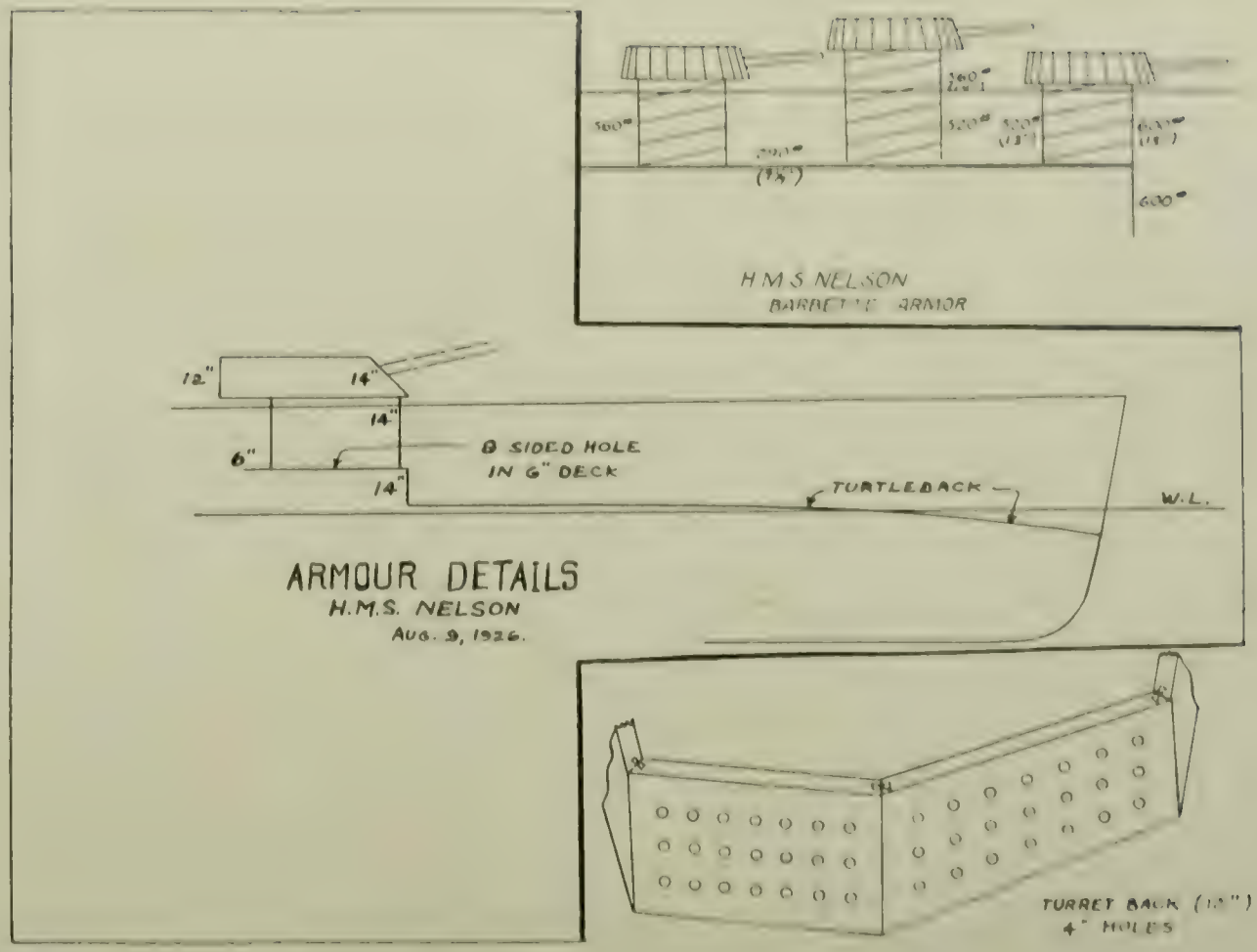
2. *Aircraft carriers and funnels.*

[Source: English press]

The question as to whether aircraft carriers shall or shall not have funnels is a very vexed one among naval architects and engineers, for although one of the most up-to-date aircraft carriers in the world, H. M. S. *Furious*, is at sea without stacks, most navies have a tendency to revert to them. Also, it is reported that the *Furious* is not by any means a comfortable ship, and when she is in port her


H·M·S·
DEVONSHIRE
10,000 tons
August 1, 1926


H.M.S. NELSON
BARBETTE ARMOR
12"
14"
14"
6"
14"
8 SIDED HOLE
IN 6" DECK
TURTLEBACK
W.L.
ARMOUR DETAILS
H.M.S. NELSON
AUG. 9, 1926.
TURRET BACK (12")
4" HOLES

crew feel the effects of the fumes finding their way everywhere in a way that can not but detract from her efficiency as a fighting unit. It is also rumoured in service circles that when her sister the *Courageous* emerges from dockyard hands she will be fitted with funnels placed right over on one side as in the *Eagle* and *Hermes*. The aircraft carrier *Argus* was the first to be reconstructed without funnels, but in her case it must be remembered that speed is a secondary consideration, and that she is not intended to keep pace with the fleet—which means at least 2 knots over and above its sea speed—like the *Hermes*, and *Furious*. The U. S. S. *Langley* was also reconstructed without funnels, but in her case it appears as unsatisfactory as in the *Furious*, and she is now being built with more normal appearance. The *Saratoga* and the *Lexington*, the most up-to-date aircraft carriers in the world, emerged from the builders, each with a colossal funnel right over on the starboard side, probably the biggest stacks ever put into a ship. In the case of the Japanese *Hosho*, the problem was ingeniously solved by fitting her with three funnels on the starboard side, designed to hinge outward and discharge their smoke horizontally when aircraft were flying on or off. It appears, however, that this has not been altogether a success and the new ships will probably have more normal funnels, although not in normal positions.

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3. *H. M. S.* "*Hermes.*"

[The frontispiece shows a recent photograph of the *Hermes*]

When the *Hermes* recently returned to Hongkong after a cruise to the Southern Islands she had a very noticeable list of 10° or more to starboard. Information was obtained from an officer of the *Hermes* concerning this. He stated that after a week's cruise she always took a list since there were no compensations made for the mast and superstructure being on the starboard side. He said they did not use water ballast, and did not pump oil to counteract the list. Furthermore, he stated that planes were not affected by the listed ship in taking off.

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4. *"County" class of 10,000-ton cruisers.*

[The attached photograph shows the 10,000-ton cruiser *Devonshire* completing at Devonport]

It has been confirmed from one of the contractors for machinery for the *County* class vessels that the contract surface horsepower will be 80,000 on four shafts "with a good margin above this figure."

and that the next group of 10,000-ton cruisers, the *London* class (Berry design), will have the same eight boilers, but of an improved type, so that the contract surface horsepower will be 96,000, "with a similar good margin." It is said that an increase of 2 knots speed is expected over the *County* class.

The *London* class (also 10,000 tons) will have the bulge merged in the side as in the *Nelson* type.

All cruisers of both classes will carry on deck four triple tubes for the new 24-inch torpedoes, but no spare torpedoes.

The "margin" of power referred to is understood to be 20 per cent above contract surface horsepower and the cruisers are "over boilered." The shipbuilder's contract requires the contract speed to be made on the contract surface horsepower. There is a heavy penalty for failure to meet such speed, but no bonus for an excess of speed. It is understood that the Admiralty wish to discourage forcing the boilers on builder's trials to show a high speed with high surface horsepower.

There is to be a catapult for airplanes mounted on the center line just abaft the tripod mainmast.

It is believed that the present coal strike, with its attending steel shortage, has not caused much delay in the work on H. M. S. *Berwick* and H. M. S. *Cumberland*, building, respectively, at Fairfield Shipbuilding & Engineering Co. (Ltd.) and Vickers (Ltd.), both of these ships being so far along as not to require much further steel. (Both of these vessels belong to *County* class.)

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5. *Cruiser mine layer "Adventure."*

H. M. S. *Adventure*, the cruiser mine-layer building at Devonport, is to be equipped with an auxiliary propelling plant embodying the electric-drive principle in connection with a Diesel installation for driving the generators thereof.

It appears that two sets of high-power submarine Diesel engines were ordered built by the Admiralty for submarines *X. 1* and *X. 2*, one set of two engines at Chatham, and the other similar set at Vickers (Ltd.). The set built at Chatham was installed in *X. 1*, and when the idea of building *X. 2* was abandoned, it was decided by the Admiralty to use the set of engines built at Vickers for experimental installation in connection with auxiliary electric drive in the *Adventure*. This set consists of two 3,000 horsepower Vickers type internal-combustion engines, so that 6,000 horsepower will thus be available for this purpose in *Adventure*, though the manner of

installing is not known and no details of the character of coupling between engines and generators are available.

It is gathered that the results of tests with this electric-drive installation in *Adventure* are being awaited with great interest and that much valuable data are expected. It seems that the Admiralty is considerably interested now in the subject of electric drive and it it entirely possible, if not probable, that a main electric-drive installation will be called for in one of next year's light cruisers.

NOTE.—The "Adventure" is a cruiser mine layer of 6,740 tons (without oil or feed water), is designed to make 27.7 knots with 40,000 surface horsepower, and to carry four 4.7-inch guns and a quantity of mines.—Ed.

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6. Submarine depot ship.

It has been learned from good authority that the new submarine depot ship for the British Navy in this year's program is to be equipped for internal-combustion engine propulsion.

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7. Naval dockyard at Rosyth, Scotland.

A visit was recently made to His Majesty's dockyard at Rosyth for the primary purpose of determining the present status of the recent decommissioning program for that yard. The process of decommissioning is practically complete, and to all intents and purposes the huge establishment is entirely inactive. There are at present employed there only about 100 men for all purposes, and only two small shops, one for woodworking and the other a machine shop, are kept available for the minor jobs that turn up in connection with the upkeep of the yard, and for the urgent emergency jobs that may arise on the few ships that still go there. The power plant is closed and lighting and electric power is obtained from a commercial plant near-by over improvised lines led into the yard.

The oil storage is still used and fuel ships come to Rosyth occasionally to discharge or take on cargoes of fuel oil.

There are no ships of the Royal Navy at present at Rosyth, except two destroyers awaiting scrapping there, one old, obsolete auxiliary ship, and six Admiralty oilers of the *Leaf* class awaiting sale. There is one small oiler and one tug based on Rosyth, but both are manned by the Royal Fleet Auxiliary Service and fly a blue ensign.

The machinery in the various shops out of commission is laid up, with protective coating of grease, and a great part of the stores formerly accumulated at the yard have been transferred elsewhere. The remainder will be removed as fast as circumstances permit.

No upkeep of the grounds is attempted, and in that respect the property is in rather bad condition.

The few officers stationed at Rosyth are connected almost entirely with the administration of the command of the coast of Scotland, the rear admiral in command thereof having his headquarters at Rosyth. This command includes the other naval activities on the River Forth (except Port Edgar), including the two ammunition depots farther up the river which are still in commission, and the mine depot at Grantham which is practically out of commission. It also covers the naval oil storage in the vicinity of Glasgow, and a few other outlying units. All together, in the command of the coast of Scotland there are now employed only about 500 men as compared to a total of 15,000 in normal peace times, of which the vast majority were at the dockyard.

The "established ratings," i. e., those dockyard employees who executed a form of contract with the Admiralty, who were formerly employed at Rosyth have been transferred elsewhere and furnished a small additional allowance of money until housed and settled in the vicinity of another dockyard. The other employees, the "hired ratings," were simply discharged with no special provision for their future.

Except for the fact that the machinery for the operation of the drydocks and of the caissons is periodically tested, there is no program as yet for any routine trials of any of the shop equipment, though it was stated that some such arrangement might become necessary later.

There is no doubt but that the yard is fully decommissioned, but it is believed that it would take very considerable time to place it in operation again, and that meanwhile much deterioration must occur.

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8. Destroyer base at Port Edgar, Scotland.

The destroyer base at Port Edgar was recently visited, and the captain in charge and his executive officer were very polite in showing all the activities there.

Port Edgar is under the general control of the commander in chief, Atlantic Fleet, and the two flotillas of destroyers based there are attached to the Atlantic Fleet. Two active flotillas of the Atlantic Fleet frequently visit Port Edgar and come there particularly before periods of gunnery exercises in northern waters so that their personnel may receive final training at the school conducted ashore, and so that any necessary work on their torpedoes may be carried out at the base. Likewise, they return after a period of

gunnery exercises for any adjustment or repair of torpedoes that may have become necessary.

The two flotillas based at Port Edgar are the seventh and eighth, of which the former is in reserve, each vessel having four deck-force ratings and four engine-room ratings as ship keepers, and there being assigned to the flotilla in addition two three-fifths crews, with which are kept in commission two destroyers, which are maintained in 24 hours' readiness for sea. The two destroyers thus maintained are changed every quarter, so that in the course of a year all of them have the benefit of this experience. The eight vessels of the seventh flotilla are of the V and W classes, with the *Mackay* as leader.

The other flotilla, the eighth, is composed of destroyers of the S class, with the *Bruce* as leader, and are maintained in commission with two-fifths complements, each of these destroyers having four officers assigned to it.

For the past year the policy has been in force of keeping at Port Edgar about 500 boys from the training establishment at Shotley or from H. M. S. *Impregnable*, the training unit at Devonport, who receive practically all their training at Port Edgar, and who remain there for six months. These boys have been received at the rate of about 80 per month and are passed out from Port Edgar at the same rate. About 50 of these boys are assigned to each destroyer of the eighth flotilla, so that recently these vessels have had practically full crews, and also an additional lieutenant for the direct charge of the boys under training. Thus the destroyers of that flotilla have been enabled to cruise for about one month each quarter and have been much more active than in the past.

The policy of sending these boys to Port Edgar was due originally to lack of space in the battleships in full commission for receiving the full output of the training establishments, but since the assignment of the third battle squadron (four "Iron Dukes") to training-ship duty with reduced regular complements, this condition no longer applies and the practice of sending boys to Port Edgar has been ordered discontinued. This is greatly regretted by the personnel at Port Edgar, who feel that the system of training some boys there has been very successful, and particularly very helpful to the destroyer service.

The gunnery training facilities at Port Edgar are excellent, including guns of the type mounted on destroyers available for all forms of drill, and elaborate methods of training and drilling both gun and torpedo fire-control crews at the actual instruments used aboard ship, and with comprehensive arrangements for including

spotting drill with this training. Evidently great emphasis is placed on this feature of the work at Port Edgar and it gives a most favorable impression.

In other respects there is nothing of particular interest at the base, and the usual arrangements for quartering the personnel ashore are in evidence. Rather special facilities are provided for the amusements of enlisted personnel in the form of an excellent canteen, theater, swimming pool, etc.

The piers at Port Edgar are capable of providing berths for 68 destroyers, but the base would be very crowded then, and the facilities ashore are hardly adequate for that number. A plan is being considered of bringing from Rosyth a floating dock to Port Edgar in order that destroyers may be docked there, and if this is done the dock would be moored between two piers and reduce somewhat the berthing capacity of the base.

The general appearance of the base and of the destroyers was very good and it seems to be a busy, efficient, and well-administered establishment, though the officers complain of lack of funds for maintenance, and the resulting deterioration of some of the property is apparent.

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9. Conditions in Malta.

[Source: Consular report]

Quite recently the naval dockyard has been releasing numbers of local workmen, and vessels which ordinarily repaired here have been ordered to England for refit. This action upon the part of the naval authorities has led to vigorous protests upon the part of the people and local press. I am reliably informed that these protests are not so much against the present policy of the navy but are voiced merely to avert further discharges and in the hope that the Admiralty will see fit to overhaul more ships in Malta during the future than in the past.

The presence of the British Navy in Malta forms the principal means of support for the local people. When the Singapore naval base is in operation it is believed that a great many of the ships on the Malta station will be transferred to the Singapore command and that consequent hardships will fall upon the people and industries of the Maltese Islands.

B. AERONAUTICAL

1. New torpedo plane.

[Source: English press]

The largest torpedo-carrying airplane in the world has just passed its official tests at the Air Ministry experimental station at Martlesham Heath, and the construction of the second of the type has been begun. The entire framework of the new machines is constructed of steel tubes, insuring exceptional strength and making it much more difficult to destroy a vital part by machine-gun fire. Details of this new air fighter are as yet secret, but it is known that it can carry the heaviest torpedo yet fitted to an airplane, together with a considerable load of bombs, machine guns, and ammunition.

Driven by two Rolls-Royce engines totaling 1,400 horsepower, it is intended to fly from its land base out to sea to attack with bomb and torpedo enemy battleships that may be approaching our shores.

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2. Equipment for foreign airplanes.

It has been learned from a reliable source that a large English manufacturer of various navigational instruments and other instruments of precision has supplied within the past six months outfits of instruments for aircraft to the Russian Government sufficient to equip about 600 planes. These outfits include compasses, bubble sextants, a usual proportion of bomb sights, a moderate number of chronometers, and other similar devices.

Within the past year the same concern has supplied similar instruments to the Czechoslovakian Government sufficient to equip about 500 planes.

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3. Naval aviation.

[Source: English press]

To say that aviation is destined to play an important part in future warfare at sea is to utter a platitude. Aircraft have already become an integral component of every well-balanced fleet, and their unique value has been demonstrated in actual war operations. In the development of this new arm the British Navy may claim to have led the way. While there is some doubt as to whether an airplane was first flown from the deck of a British or an American man-of-war, it is not disputed that we were the first in the field with the aircraft car-

rier, which has made possible the remarkable progress in naval aviation. At the beginning of the war several cross-channel steamers were converted into airplane carriers, one of which did useful service at Jutland. Then the Cunard liner *Campania* was fitted with a flight deck, from which machines could take off, though they were unable to make landings on it. The next stage was the conversion of the light battle cruiser *Furious*, which became the prototype of the modern carrier. She proved a great success, and it was from her deck that the most successful naval air attack of the whole war was launched, when a flight of machines bombed the German airship sheds at Tondern, destroying two Zeppelins.

Meanwhile, the Admiralty had purchased the Chilean battleship *Cochrane* and the Italian liner *Conte Rosso*, lying unfinished in British shipyards, and caused them to be rebuilt as aircraft carriers, under the respective names of *Eagle* and *Argus*. Finally, in January, 1918, the *Hermes* was laid down, she being the first ship in the world to be designed above for the transport of aircraft. Since the war the two battle cruisers *Glorious* and *Courageous* have been taken in hand for conversion. The result is that we now possess a fleet of carriers of which there is no counterpart in any foreign navy. Excluding two that are obsolete, it consists of six vessels, ranging from 10,550 to 22,600 tons. The *Argus*—the slowest unit—has a speed of just over 20 knots; the *Eagle* is good for 24 knots; the *Hermes* for 25; and the *Furious*, *Glorious*, and *Courageous* for 31 knots. The combined aircraft capacity of these six ships is not definitely known, but it can not be less than 160 machines.

Turning to other navies, the United States is first with two very large carriers, *Lexington* and *Saratoga*, originally begun as battle cruisers. The displacement is 33,000 tons, the designed speed 33.34 knots, and the stowage capacity 72 airplanes per ship. Unlike our carriers, which mount nothing heavier than 6-inch guns, the American type is very powerfully armed, having eight 8-inch 55-caliber guns in twin turrets, twelve 5-inch quick-firers on high-angle mountings, and four torpedo tubes. It is, in effect, a composite type, half battle cruiser and half aircraft carrier, its combatant character being further emphasized by substantial belt armor and bulge protection. Japan is pursuing much the same policy. Her largest carrier, the former battle cruiser *Akagi*, of 27,000 tons and 28.5 knots, mounts no fewer than ten 8-inch and sixteen 4.7-inch guns, and it is understood that the *Kaga*, an ex-battleship, of 26,900 tons and 23 knots, will have a similar armament. It will be seen that H. M. S. *Eagle*, our largest ship, is smaller by 10,400 tons than the American type, and is considerably lighter than the Japanese vessels. In British naval circles,

however, the utility of such monster ships is questioned. Logically considered, the carrier is not a fighting ship but an auxiliary; her prime function is to furnish a floating base for aircraft working with the fleet. Being peculiarly vulnerable to gunfire and other methods of attack, she should keep as far away from the enemy as is consistent with the performance of her special duties. Otherwise, the necessity of affording her protection will impose a serious burden on the fighting ships proper.

Moreover, the sinking or disablement of a carrier such as the *Lexington* or the *Akagi* would be a disaster of the first magnitude, since it would deprive the fleet to which she belonged of half its air force at a single blow. Hence the preference in this country for carriers of moderate dimensions, such as the *Hermes*. The reconstruction of such comparatively large vessels as the *Glorious* and *Courageous* is probably dictated by motives of economy. Had funds been available, new ships of smaller tonnage would doubtless have been laid down. But, although American policy with regard to carrier dimensions may be open to criticism, there are other features of aviation development in the United States Navy which seem to us worthy of emulation. We refer particularly to the principle of supplying airplanes to every type of vessel capable of carrying them. According to recent information, every American battleship in the fleet now carries one scout and two combat machines, and each cruiser two scouts. They are discharged from the ship by means of catapults. During the visit of the United States light cruiser *Memphis* to Gravesend this month we had an opportunity of inspecting her aircraft equipment. The two seaplanes were stowed amidships, each on its own catapult. Certainly they occupied a good deal of deck space, but their presence did not seem to interfere with the effective working of the ship or her armament. We were informed that flying exercises were part of the ordinary routine of training, and that no difficulty was experienced in launching the machines in normal weather. They are propelled from the catapult by an air blast at a velocity of 60 miles an hour. On returning from the air they alight on the sea as close to the ship as possible, whence they are hoisted in by the derrick. By constant repetition the operation of launching the machines and recovering them from the sea has been brought to a high standard of efficiency. Seaplanes of a diminutive type have been designed for the use of destroyers, and 20 of these boats now carry one machine apiece.

Even submarines have been experimentally fitted with tiny seaplanes. In all, something like a hundred airplanes are now distributed among the ships of the United States Navy, in addition to

those borne in the carriers. The battleships use their aircraft chiefly for "spotting" purposes, and are thus able to acquire practical experience in long range indirect gunnery. Cruisers detailed for patrol or reconnaissance must find their aircraft invaluable. Had our cruisers been equipped with airplanes on the outbreak of war it is virtually certain that all the German raiders then at large would speedily have been laid by the heels. The career of the *Emden*, *Karlsruhe*, and others would have been numbered by weeks or even days instead of by months. At that period, however, reliable aircraft for use on board ship had not been evolved, and so our cruisers had to dispense with what would assuredly have proved an adjunct of priceless value. But by now the most serious technical difficulties have been overcome, and it is to be hoped that the Admiralty will not be behind hand in providing aircraft for such of our warships as could employ them with profit—that is, battleships and cruisers.

The American Navy enjoys one marked advantage—it has absolute control of its air branch, which is thus organized strictly in accordance with naval deeds, no other department having a voice in the matter. In time, as we hope, this rational system will be introduced here, and the navy's flying service divorced from Air Ministry control, which acts as a drag on the wheels of progress. Convincing evidence of the importance attached to aviation by the American naval authorities is afforded by recent legislative action. A bill which passed through Congress last month, and has since become law, authorizes the expenditure of £17,000,000 on the naval air service during the next five years. It provides for the construction of 1,947 new airplanes and the maintenance at all times of an effective force of not less than 1,000 machines.

Lighter-than-air craft are to be represented by two rigid dirigibles, each to be three times as large as the ill-fated *Shenandoah*. Not the least important section of the bill is a clause which creates the post of Second Assistant Secretary of the Navy, whose sole duty will be the administration and supervision of the air arm. It is further enacted that every officer appointed to command an aviation school, a flying station, or an air unit shall be a qualified aviator. Thanks to this far-reaching measure, the future of the American Navy's Air Service would seem to be assured. On the other hand, though the present strength of the British Navy in aircraft is difficult to estimate in the absence of reliable figures, we believe we are correct in describing it as inadequate even for the needs of the moment. There should, we submit, be enough machines on hand to fill up all available aircraft carriers to capacity and to provide at least two for every

battleship and at least one for every cruiser on the active list, with a liberal margin in reserve. No doubt the Admiralty is doing its best to attain this standard, but there are obvious difficulties in the way, not the least of them being the well-meant efforts of the Air Ministry to balance the conflicting claims of the navy, the army, and the Royal Air Force itself. We shall not presume to decide between the claims of these respective services, but we are definitely of opinion that the formation of an adequate and autonomous naval flying corps is a national requirement of capital importance.

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4. Antiaircraft activities.

[Source: English press]

The searchlight battalions of the Royal Engineers, whose task is to cooperate with the antiaircraft gunners and the high altitude single-seater fighters of the Royal Air Force in warding off attacks by night, are this year training in the Isle of Thanet. Manston aerodrome, situated some 3 miles from Ramsgate and 4 from Margate, has, since June, been the center of an elaborate system of searchlight stations. This week-end when the Twenty-sixth (London) Searchlight Battalion R. E. (T. A.) leave camp after a fortnight's useful work, 15 searchlight stations will be dismantled. Operations have, in fact, been carried out over an area which would inevitably be involved in any future European war.

The major general commanding the air defense of London, also spent a few days earlier in the week watching the practice. This has included sound locater and searchlight work almost every night, with the assistance of the big Vickers *Virginia* night bombers of No. 9 Squadron of the R. A. F., stationed at Manston aerodrome, and last night's operations were to have been the culminating point of the training and a real test of the effective use of searchlights against aircraft.

Hitherto the airplanes have flown on certain definite figure-of-eight courses, and have not attempted to dodge the lights, in order that ears mainly used to the noise of a big city might become trained to picking up a sound from the sky and to locate it accurately by the balance of the noise from the aircraft in the large revolving ear trumpets of the sound locater. Similarly, conditions were not made too difficult for the searchlight crew in following the directions of the sound locater, and keeping the light steady on the aircraft while the angles with the fixed base lines were read off for ascertainment of the position and probable course of the aeroplane. Last night, however, had the weather not effectively shut down all

night operations, three *Virginians* were to have flown out to sea beyond range of the sound locaters, and then turned and flown over the area covered by the searchlights, which would have been standing by ready for the raid signal. The pilots were instructed to use every possible artifice to avoid discovery, and, when found, to lose themselves once more in the night sky. Careful records were to be kept of their compass courses, and these would have been compared afterwards with the courses as planned at battalion headquarters on the reports from the lights. Low cloud all day, a heavy storm in the afternoon and cloud and mist later boded ill for the night, but not until 7 o'clock was the exercise definitely and, as it proved later, wisely cancelled.

THE TRIANGLE SYSTEM

It is useless to speculate as to who would have won, but with heavy bombers in a clear sky the advantage should have been with the searchlights if efficiently manned and with prompt cooperation between the various sections, unless the sound locaters became confused between aircraft flying different courses or the aircraft throttled down and glided over the area. The triangulation of the searchlight points is such that an airplane once found should not be lost, and should be handed on by the fingers of light from one section to another. The method is simple but interesting. The lights are placed in triangles with 3,000-yard sides, and the triangles are continuous over an area. An airplane once found should be held by not more than four lights, and except in the case of a swift single seater should not escape again. The men in charge of the lights watch the aircraft until it crosses one of their base lines to the two other points of the triangle. At that moment the man at each end of the base line reads the angle of his beam; this information is at once telephoned to headquarters, and thus the height and the position of the aircraft at that moment is fixed by simple calculation in a few seconds. As the aircraft leaves one section for the next the process is repeated, and by linking up the points obtained on a map the course of the machine can be soon ascertained and other steps taken to deal with it.

C. MISCELLANEOUS

1. Industrial conditions in private shipyards.

The following visits to private shipyards in England and Scotland have recently been made:

Hawthorn, Leslie & Co. (Ltd.), near Newcastle-on-Tyne; Sir W. G. Armstrong, Whitworth & Co. (Ltd.), near Newcastle-on-Tyne.

William Denny & Bros. (Ltd.), near Glasgow; John Brown & Co. (Ltd.), near Glasgow; Sir William Beardmore & Co. (Ltd.), near Glasgow.
Fairfield Shipbuilding & Engineering Co. (Ltd.), near Glasgow (Govan).
Vickers (Ltd.), Barrow-in-Furness.

Due originally to the general slump in the shipbuilding industry since about 1920, and emphasized at present by the existing coal strike, a situation of great depression exists now at all private shipyards. Some of the yards suffer from actual lack of coal themselves, but the greatest effect of the strike is in their inability to obtain any steel from outside manufacturing contractors. A few companies have steel plants of their own located elsewhere, and have been able thus to obtain small quantities of material for ship construction, but the majority are getting practically no deliveries whatever, and work is at a standstill on ships not yet laid down or only in an early stage of construction. At the larger yards capable of capital ship construction, frequent references were heard to the disastrous effect of the Washington Limitation of Armaments treaty, which barred them for the time being from capital ship work, except the *Nelson* and *Rodney*.

The percentage of employees now at work as compared to normal pre-war times varies from about 10 per cent to 70 per cent. This variation depends considerably on the state of completion of ships under construction at the several yards when the coal strike caused the steel shortage. The yards having Admiralty or commercial work so well advanced that considerable amounts of steel are no longer necessary for them, are thus in a materially better condition at present. In this connection, whereas some years ago shipbuilding employees worked 54 hours a week, repeated concessions to labor interests have now resulted in only a 47-hour week.

It seemed in general that conditions on the Tyne are somewhat worse than on the Clyde, though William Denny & Brothers (Ltd.) is in bad straits and undoubtedly operating at considerable loss, having had fewer launchings in the past seven years than in either of the two years preceding the war. However, on the Tyne, six fairly large yards and four smaller ones have had to close down entirely in recent years, and the general aspect in passing up and down the river is most depressing.

The Admiralty, though not sacrificing the Royal dockyards, endeavors to distribute other available construction fairly between the more important of the commercial plants, and among the yards mentioned above, contracts have been awarded for four light cruisers for the British Navy, and two light cruisers and two submarines for Australia, and the machinery for four light cruisers building at Royal dockyards. This is in addition to the *Nelson* nearing comple-

tion at Sir W. G. Armstrong, Whitworth & Co. (Ltd.), the *Rodney* being in the same status at the works of Cammell Laird & Co. (Ltd.), which was not visited.

All the private yards are glad to take contracts for commercial ships of various types, in which they would not have been particularly interested during periods of large naval programs. Some of the yards have resorted to various special ventures such as locomotive building and reconditioning, manufacture of oil-well machinery for Russia, etc.

It was interesting to learn that some of the yards, even before the present steel shortage, were compelled to place contracts for both steel plates and steel castings in Germany, because of the greatly reduced price at which they can thus be obtained. It was stated in one case that steel castings from Germany could actually be delivered at the British yard for about one-half of the cost of similar products from British steel plants. It was added that the competition in British shipbuilding has become so acute that patriotic motives can no longer govern, and that some encouragement to home industries seems essential in the form of protection or subsidy.

Several yards have undertaken to build ships as speculations in order to hold their working force together, but there is great difficulty in selling such vessels at the present time.

The recent awards of contracts for a number of Canadian Pacific vessels of different types, to several of the yards has given encouragement and better times are hoped for, though with no immediate optimism.

There is not much new Admiralty work in sight, but tenders are being submitted by the yards capable of building them, for the one 3,000-ton cruiser and five submarines of the current year's program to be built in private yards. It is understood that request for tenders for one 10,000-ton cruiser is expected in the near future, the other such vessels in this year's program being promised to a Royal dockyard. It was also gathered that the tenders submitted for the submarine depot ship of this year's program have resulted in the practical assurance that this ship will be awarded to Vickers (Ltd.).

There is comparative inactivity also in the aircraft section of Sir William Beardmore & Co. (Ltd.).

Financial difficulties are confronting the managements of all private shipyards at present, and the shares of the limited companies are far below par. Reorganizations and revised financial plans are of frequent occurrence in the industry, and there are signs everywhere of desperate efforts to make both ends meet in the extremely trying situation in which the private shipyards in Great Britain are now placed.

ITALY

A. NAVAL

1. *Degree of completion of naval ships building*

Name	Shipyard	Per cent completed	Date of completion	Remarks
LIGHT CRUISERS				
Trento	Orlando, Livorno	25	Indefinite	10,000 tons, about 37 knots, eight 8-inch, twelve 4-inch and anti-aircraft guns
Trieste	Stabilimento Tecnico Triestino	10	do.	
DESTROYERS				
Q. Sella	Parisini, Naples	Completed		1,150 tons, 36 knots, three 4·7-inch guns, six 20-inch torpedo tubes
R. Rossarol	do.	98·7	July, 1936	
F. Crispi	do.	89	do.	
G. Nicotera	do.	46	Indefinite	
N. Sauro	Odero, Sestri Ponente	89	Second half 1936	1,250 tons, 37 knots, four 4·7-inch guns, six 20-inch torpedo tubes
C. Battisti	do.	83	do.	
D. Manin	Cantiere Quarnaro, Fiume	48	do.	
F. Nullo	do.	41	do.	
Turbine	Odero, Sestri Ponente	7	do.	
Aquilone	do.	45	do.	
Nembo	Ansaldo, Genoa	89	do.	1,350 tons, 38 knots, four 4·7-inch guns, 4 20-inch torpedo tubes
Euro	do.	36	do.	
Borea	Ansaldo, Sestri Ponente	71	do.	
Zeffiro	do.	39	do.	
Espero	do.	36	Second half 1937	
Ostro	do.	41	do.	
SUBMARINES				
Balilla	Ansaldo, S. Giorgio, Spezia	79	Second half 1936	1,300/1,730 tons, 16·5/19·5 knots, one 4·7-inch gun, six 21-inch torpedo tubes, 1 anti-aircraft tube
E. Toti	do.	44	do.	
D. Millelire	do.	31	do.	
A. Sciesa	do.		Indefinite	
V. Pisani	Cant. Nav. Monfalcone, Trieste	80	Second half 1936	800/940 tons, 17·5/19 knots, one 4-inch gun, six 21-inch torpedo tubes
M. Colonna	do.	21	Indefinite	
G. Bausan	do.	8	do.	
Des Geneys	do.	6	do.	
Masaniello	Cantiere Tosi, Taranto	70	do.	777/924 tons, 17·9 knots, one 4-inch gun, six 21-inch torpedo tubes
Pier Capponi	do.	47	do.	
G. Da Procida	do.	44	do.	
Tito Speri	do.	42	do.	
E. Fieramosca	do.	Ordered		
MINE LAYERS				
Buccari	R. Cantiere, Castellammare	85	Second half 1936	590 tons, 19 knots, 100 mines
Durazzo	do.	71	First half 1937	
Pelososa	do.	58	Second half 1936	
Milazzo	C. Nav. Tirrenia, Monfalcone	78	do.	
Dardanelli	do.	58	do.	700 tons, 16 knots, two 4-inch guns, number of mines unknown
Ostia	do.	43	do.	
Azio	Cant. Nav. Riuniti, Ancona		do.	
Legnano	do.		do.	
Lepanto	do.		do.	
AUXILIARIES				
G. Miraglia	R. Arsenale, Spezia	86	Indefinite	Aircraft carrier, 5,000 tons
Quarnaro	Cant. Nav. Sorgito, Oliv. Pola	94	Second half 1936	Repair ship
Tarvisio	R. Cantiere, Castellammare	78	Second half 1937	Tanker
C. Colombo	do.	Ordered		
M. A. S. MOTOR BOATS				
423, 424, 425, and 426	Cantiere SVAN, Venezia		Indefinite	

2. *Ferretti device for submarines.*

Engineer Pericle Ferretti, professor of mechanics of the Royal Politecnico of Naples, has invented a device to permit a submarine to cruise on Diesel engines while submerged to slight depths. The following is a translation of Engineer Ferretti's description of the advantages to be obtained by this device:

The radius of action of submarines as now built is proportionate to the power of the accumulators, i. e., 1 hour at the maximum subsurface speed (about 9 knots), and 20 to 25 hours at normal cruising speed (80 to 100 knots).

When the accumulators are discharged the submarine must emerge to recharge the batteries and must remain for several hours in conditions greatly unfavorable to offense and defense.

While submerged living conditions are inferior to those of a surface ship, this being another obstacle to prolonged immersion.

Subsurface speed is generally very limited and could only be increased at the detriment of other characteristics of the ship, viz, its surface speed.

The present device aims at allowing all submarines to cruise under surface using Diesel engines instead of electric engines, with speed and comfort approximately the same as cruising on the surface and to permit the commanding officer to dive to any depth at any instant without any movement of water and without closing any valves or doors, but simply maneuvering the elevator.

The assets of the submarine are in consequence considerably increased as follows:

(1) The subsurface radius instead of being proportionate to the power of the batteries, is proportionate to the Diesel engine fuel supply, and is, therefore, 100 to 200 times greater than in ordinary submarines. The ship can cruise under surface (without ever emerging) 1,000 to 2,000 miles at the same speed at which an ordinary submarine travels to cover only 9 or 10 miles.

(2) The maximum undersurface speed of a ship with our apparatus becomes very much greater than that of an ordinary submarine. This on account of the power of the electric motor being less than that of the Diesel engine.

(3) Batteries may be charged by means of Diesel engines during immersion. This enables one to have the batteries always charged, ensuring the best possible conditions for attack at any time.

(4) The sector of attack for a submarine with our device is considerably greater than for an ordinary submarine.

(5) The economy of electric power effected by this device on a submarine approaching for an attack is from 42 to 100 per cent, proportionately to the target's speed.

The weight of the apparatus is around 4 or 5 tons and no noticeable incumbrance is given to rest of ship. It may easily be installed on submarines already built.

The device has already been fitted on an Italian *H* type submarine and the results have been such as to induce the Italian Government to have it fitted on new submarines under construction.

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3. *Safety device for submarines.*

An Italian civilian named Menotti Nanni has invented what he terms an "unsubmergible cabin" which he proposes to secure to

the hull of a submarine by means of ingenious, and very positive, pneumatic devices. Of these, there are two types. The spherical type used on the end fixtures of the cabin are not new, but the inventor claims that his "pneumatic ring" is entirely new.

This consists simply of two flanges, each ground to a surface plate at contact, with an annular groove having a pipe connection by means of which a partial vacuum may be created in, or the surrounding pressure admitted at will to, the annular groove and between the flanges.

It is obvious that the deeper the submarine is submerged, the more rigidly the cabin will be secured, unless the pet cock is tampered with, thereby releasing the cabin and flooding the submarine. But there should be no difficulty about the installation of foolproof safety devices.

In case of collision and of direct impact with the cabin there would appear to be no more danger than that which any other compartment would be liable to, unless the vacuum pipe were ruptured. Sturdiness of construction should guard against this remote contingency.

The idea of the invention is that if a submarine fitted with this device sinks to the bottom, the crew mans the unsubmergible cabins, closes the water-tight doors, opens the pet cock, thereby releasing the cabin from the hull, and floats to the surface. When not used for abandoning ship these cabins augment the living quarters of the crew.

There is no means of closing the water-tight door in the hull of the submarine from within the cabin. The attention of the inventor was drawn to the very great desirability of such an installation in case of subsequent salvage operations and he assures me that he has corrected this defect.

B. AERONAUTICAL

1. Accident to semidirigible "N–2."

While returning to the Ciampino Airdrome after having escorted the steamship *Biancamano* (on which General Nobile and party were passengers) into Naples Harbor, the semirigid dirigible *N–2* was forced to land in the sea near Gaeta. One officer and one enlisted man were killed. The dirigible was considerably damaged in the crash, and further damaged while being towed to Gaeta Harbor by destroyers. It is now completely submerged in the harbor and salvage operations are in progress. The ship is considered practically a total loss.

The cause of the accident was the breaking of the propellor of the radio generator, a piece of which tore a large hole in the gas bag and caused a rapid descent. According to a member of the crew of the dirigible at the time of the accident, the ship struck the water with considerable force, and then bounced or porpoised rather high into the air and then came down again. All the crew were thrown or jumped into the water at the time of the first impact, but the officer who was killed hung to a guy rope when the ship bounced into the air, and dropped into the water from a considerable height and disappeared. The enlisted man who was lost could not swim and was drowned. The other members of the crew were not injured. They swam to the dirigible and held on to it until they were rescued by a fishing boat several hours later.

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2. *Seaplanes for Schneider cup race.*

It has been learned from a reliable source that the Macchi Co. is building three new planes for the Schneider cup race, instead of two as reported. No information as to the characteristics of the new racers, has been ascertained.

The new racers are now practically ready for flight test, but none have been flown yet. The predicted speed (from calculations after wind tunnel tests of the model) is said to be around 400 kilometers per hour.

Arrangements are being made for the Italian racing detachment (personnel and material) to sail from Italy for New York on the steamship *Biancamaio* on September 25, 1926.

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3. *Distribution of Italian air squadrons.*

Service	Class of squadron	Number of squadrons
Independent Air Force	Pursuit	24
	Night bombardment	10
	Day bombardment	10
		44
Attached to army	Observation	20
Attached to navy	do	13
	Pursuit	6
		19
School squadrons		5
Depot squadrons		4
Colonial squadrons		6
Grand total all squadrons		98

NOTE.—See September Bulletin for chart of organization of the Italian air force.—Ed.

NETHERLANDS

A. NAVAL

1. Inspection of Burgerhout's Machinefabriek & Scheepswerf, Rotterdam.

A visit was made to the shipyard Burgerhout's Machinefabriek & Scheepswerf at Rotterdam on August 6, 1926, and an opportunity was afforded of inspecting the shops and vessels under construction.

The company is an old organization but until now has never bid on naval construction. The plant, while small, is modern and most efficiently laid out. The atmosphere about the plant is excellent and they appear like an up-and-doing organization. The plant is complete in all particulars and capable of fabricating a ship and machinery complete.

The only work at present going on is the building of three destroyers for the Dutch Navy. This work is progressing satisfactorily and the ships should be ready in 1927. The three boats are being constructed on one way and the workmen can walk from one to the other, thus adding to economy of construction.

These destroyers are of Yarrow design, 1,620 tons displacement. They are to be fitted with Parsons turbines and reduction gear. The engines are being constructed at this plant but the teeth of the reduction gears were cut by Parsons.

Three Yarrow boilers, two large and one small, will be installed, all erected at this plant.

DESCRIPTION OF VESSELS

Length	322 feet.
Beam	31.2 feet.
Displacement	1,620 tons.
Speed	34 knots on 32,000 horsepower.
Armament	Four 4.7 inch, two forward and two aft on platforms, one above the other.
	Two 3 inch antiaircraft, one on each side amidships, on raised platforms.
Torpedoes	Two triple tube mounts on center line abaft smokestacks.
Mines	Mine storage aft on main deck with portable mine rack.
Airplanes	One raised airplane platform on the center line just forward of the after deck house. Derrick fitted on after side of main mast.
Living quarters	The officers' quarters are aft and will be most commodious and comfortable. The crew's quarters are forward and should be very comfortable.

Following the Dutch custom, much wood is being used in the construction. All the living quarters are fitted with wooden furni-

ture and the battens and storage facilities in the magazines are of wood.

A fourth boat of this type is being built at the Schelde. Parliament has recently authorized two additional boats and bids will be asked for them in a few weeks.

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2. *Dutch submarine "K–XIII."*

An opportunity was afforded for fairly detailed observation as to type, arrangement, etc., of hull, machinery, and fittings of the *K–XIII*, and these will be described under the following general headings: (*a*) Hull, (*b*) ballast tanks, (*c*) torpedoes and torpedo tubes, (*d*) guns, (*e*) storage battery, (*f*) main motors, (*g*) main engines, (*h*) electrical equipment, (*i*) diving control, (*j*) control stations.

(*a*) HULL

The hull is apparently of "single hull" type of construction with outer free-flooding structure extending from about water line up the deck level, very similar to that in our S boats. The hull is about 210 feet long by 18 or 20 feet beam and of conventional form with slightly raised bows. The interior of the vessel is divided into four water-tight compartments by three transverse bulkheads that appeared to be rather light in structure though fairly well braced with vertical stiffeners, conventional type of water-tight door being hinged on one side, secured as in our vessels but no peepholes or observation ports provided in water-tight doors; frames are spaced about 24 inches apart. Interior of boat apparently fairly comfortable and well ventilated. Crews quarters fitted with varnished wooden lockers and standee bunks of approximately same construction as ours, viz., hinged pipe frames with canvas bottoms laced in. Men's quarters in torpedo room and above forward battery tanks. No smoking permitted below decks.

Large roomy conning tower provided with a metal sheathed chariot bridge on top. Conning tower and conning-tower fair water are much roomier than in S boats. Two periscopes, one operated from central operating compartment, the other from conning tower, extend upward through fair water, capable of 360° train but only horizontal vision, no elevation possible. Telescoping radio mast in four concentric sections extending upward from after end of fair water, very similar in appearance to mast of *S–2*, total height about 55 feet. Only one set of clearing wires, one forward and one after section, were noted; these were insulated with large-sized, green-porcelain "goosegg" insulators at each end.

(*b*) BALLAST TANKS

Ballast tanks in this vessel are disposed approximately the same as in S boats, viz, forward, middle, and after main ballast tanks and auxiliary ballast tanks. The arrangement of forward and aft trimming tanks and torpedo compensating tanks appeared to be about the same as S boats. The auxiliary main ballast tank is located approximately beneath the conning tower.

(*c*) TORPEDOES AND TORPEDO TUBES

This vessel carries six torpedo tubes; a nest of four forward, two 18-inch on top and two 21-inch at bottom; inboard ends of lower tubes project about 18 inches inboard of loading ends of upper tubes; two 18-inch tubes aft carried at such a level as to bring their outer gates to about 6 inches below surface trim water line. Torpedoes apparently normal Whitehead construction, fitted with normal starting lever, water tripper, etc., and driven by Brotherhood engine. Only 18-inch torpedoes were visible, the 21-inch torpedoes probably habitually carried in tubes; no reserve torpedoes noted in torpedo compartment.

Overhead trolley of ample I-beam section provided for port and starboard sets of tubes both forward and aft, fitted with chain hoist of standard pattern. Ordnance air compressor not visible nor was any C. & R. air compressor in evidence. No low or high pressure air banks were visible, although one nest of air bottles, apparently low pressure, were noted abaft the main motors and just under motor-room deck. Electrical communication from torpedo tubes aft probably to central operating compartment and conning tower. Inquiry as to sounding machines developed the fact that none are carried, that the vessel is, however, fitted with some form of " Echo " device (sonic depth finder?).

(*d*) GUNS

Only one gun of approximately 3-inch caliber fitted with conventional Hotchkiss breach mechanism was noted. This gun was located forward of conning tower fair water approximately in location of gun on S boats, and was mounted on fairly high pedestal mount apparently fitted for not more than 35° to 40° elevation.

The sighting mechanism consisted of a yoke and sight bar mounting with elevation and deflection controls and dials very similar to those fitted on our broadside guns, of excellent and rugged construction. Holders fitted for single telescopes only; sight setters position on right side of gun; elevating and train controls right and left.

Did not note which elevating and which train. Magazine located below floor of central operating compartment and ammunition passed through conning tower and over rail formed into right and left sponsons in wake of gun very similar to S boats.

(*e*) STORAGE BATTERY

Battery carried in two tanks one forward one aft of central operating compartment very similar to S boats. Battery was not seen, no data obtained as to size, capacity, number of cells, etc., but the boat appeared to be fitted with an excellent exhaust ventilating system, two exhaust blower motors being fitted in the after lower corners of each battery compartment. The battery tanks appeared to be covered with a thick rubber mat with wooden hatch sections laid down on top in suitable bounding angles, similar to S boats.

(*f*) MAIN MOTORS

Two main motors said to be of double commutator type, 500 horsepower capacity, are mounted in one watertight compartment abaft and below the level of main engines, and large bank of air bottles (apparently low pressure) between and abaft the main motors.

In general appearance these motors were very similar to those in S boats as to approximate diameter and length, and appeared to be practically water-tight. Motors are controlled by solenoid operated air valves very similar to German *UC 111*.

(*g*) MAIN ENGINES

Two main engines of "Augsburg-Nuremberg" type and manufacture are installed. These engines are the conventional type of six-cylinder four-cycle, fully reversible, Diesel motors designed by that company, and are in every respect similar to those in German *UC 111* and in German motor ships *Haveland* and *Mumsterland*, except for size. Two scavenger cylinders are carried, resulting in apparently eight-cylinder construction. The valve rocker shaft or fulcrum rod for each motor was sectional, each section covering two cylinders; each section being provided with separate control member to control rotation. These rocker shaft sections are carried in eccentric bearings, fitted for 90° rotation, for the purpose of lifting the rollers at the lower end of rocker arms off their respective cams to permit of a longitudinal movement of the cam shaft to accomplish reversing.

The cam shaft was apparently solid throughout the length of the engine. The crank was said to be in two sections, coupled with normal coupling flanges, using conical coupling bolts. Controls for

admission of starting air, rotation of rocker arm shaft, longitudinal motion of cam shaft and fuel valve were all grouped at the forward end of each engine near the inboard side. Each cylinder has four valves, each valve being actuated by a separate cam and rocker arm. Counting from forward aft the valves occur in each cylinder in the following order: Intake valve, fuel spray valve (fitted with sectional, quick-acting cam), air valve, and scavenging or exhaust valve.

Inquiry developed the fact that the pistons can not be removed through the crank case, but a renewal of pistons involves the disconnecting of a two-cylinder section of rocker arms and rocker shaft, removing the cylinder head involved, disconnecting the connecting rod involved at the crank, and lifting out of piston connecting rod assembly through top of cylinder.

Some form of fuel measuring pump is used and this is fitted next to the engine control station. Engine revolution counters are of both mechanical and electrical (Tachometer type). Cylinders of main engines are water cooled, pistons are oil cooled with an oil pool in the piston head; circulation of oil for this purpose being tapped off at low pressure from the main lubricating oil supply line and led into and out of the piston head through an articulated pipe structure which duplicates the engine crank motion. It was noted that the exhaust manifold which is water jacketed, leads directly into a curved exhaust line section approximately 10 inches in diameter and about 8 feet long which is not jacketed, and which couples directly on to the exhaust line sealing valve, a muffler being presumably located just above this and outside of the pressure hull.

(*h*) ELECTRICAL EQUIPMENT

Electrical equipment throughout appeared to be of thoroughly good construction; most of the indicating and recording instruments bear the label of "Siemens-Halske." All indicating instruments that were seen were of vertical switchboard type. The switchboard was peculiar in that it appeared to consist of a series of metallic cells with a connecting bar across the front of the cell. All fittings appeared to be of standard water-tight construction similar to those in use in our Navy. All exposed wiring appeared to be of standard leaded and armored material brought into branch, switch, and fuse boxes via standard stuffing tubes and glands.

The gyrocompass is a standard three-wheeled "Anschuetz" compass; only three repeaters were noted; one in central operating compartment, one in conning tower, and one on bridge. All ventilating and drain pump motors appeared to be solidly built, of ample power, and solidly water-tight.

(*i*) DIVING CONTROL

Forward and after horizontal or diving rudders are controlled by a pair of wheels located on the port side of central operating compartment in approximately same location as in S boats. Spirit level inclinometers and manometer depth gauges are conveniently placed, very similar to S boats.

Inquiry developed the fact that main ballast tanks are of quick flooding type. No data was obtained as to main ballast Kingstons, but their control stems come up and through floor plates of central operating compartment very similar to deck stops on destroyers. Upper ends of Kingston control stems were ranged at after end of central operating compartment in about same location as S-boats, valves probably ranged closely along either side of vertical keel. Said to be capable of flooding completely in 55 seconds.

Main drain pumps located in port and starboard after corners of forward battery room, central operating compartment, and after battery room. Auxiliary drain pumps of reciprocating type are fitted at after end of main motors, driven by spur gearing from propeller shafts and engaged or disengaged at will by a suitable clutch on each shaft. Main shaft clutches are located abaft driving gears for auxiliary drain pumps and forward of main motors.

Tank vents are located under ceiling of central operating compartment and compartments immediately forward and aft of same. All main ballast tanks are fitted with "Pneumercator" gauges and some form of integrating mechanical gauges, probably float operated. Fine adjustments of trim made by venting or pumping of trimming and auxiliary main ballast tanks as necessary.

(*j*) CONTROL STATIONS

The central operating compartment is located between forward battery compartment and main engine room with water-tight bulkhead at either end, and contains all of the various controls, such as main ballast Kingstons, middle main ballast vents, master gyrocompass, switchboard, diving rudder controls, one periscope, radio room, sonic depth finder and an instrument (not shown) said to be for measuring density of earth's magnetism at various locations; engine and main motor telegraphs, steering station, and voice tube and telegraph communication to the various parts of the boat.

3. The general impression gained from an inspection of this vessel was highly favorable. She appears to be well designed and well built and is fairly roomy and comfortable for a submarine of her displacement. The officers' and crew's quarters, although narrow, appear comfortable and ample and were very clean. The statement

was made that she carries reserve fuel in her main ballast tanks and that but little reserve fuel will be necessary at Honolulu, the vessel intending to refuel at Guam upon arrival there. The voyage from Mazatlan to San Francisco was made in eight days with but slight discomfort due to general warm weather and temperature of surface water. The water line appeared to be quite foul, indicating need for docking.

NOTE.—*See September "Bulletin" for further report on the "K–XIII."—Ed.*

B. AERONAUTICAL

1. Organization of air force.

[Source: M. I. D.]

The Dutch Army has on hand, for immediate use, the following types of Fokker planes: *D–VII*, 16; *C–I*, 56; *C–IV*, 31; *C–VI*, 19.

The Dutch Navy, similarly, has the following: Fokker *D–VII*, 12; Fokker *C–V*, 6; Van Berkel, 10.

These types are as follows:

D–VII, biplane, Mercedes, 160 horsepower, double machine gun firing through propeller,

Same plane, but with 185 horsepower motor, M. B. W.

(Maximum speed 200 kilometers per hour, elevation to 5,000 meters in 18 minutes; ceiling of 7,000 meters; sphere of action 2½ hours; military cargo 125 kilograms.)

C–I, Biplane, M. B. W. motor, 185 horsepower, one Vickers machine gun, one light machine gun, 1920.

(Maximum speed 180 kilometers per hour, elevation to 5,000 meters in 30 minutes; ceiling of 5,500 meters; sphere of action 4 hours; military cargo 130 kilograms.)

C–IV, biplane, Liberty motor, 450 horsepower, one Vickers machine gun, one light machine gun, 1920.

(Maximum speed 220 kilometers per hour, elevation to 5,000 meters in 19 minutes; ceiling of 7,000 meters; sphere of action 3½ hours; military cargo 350 kilograms.)

C–VI, biplane, M. B. W. motor, 250 horsepower, one Vickers machine gun, one light machine gun, 1920.

(Maximum speed 200 kilometers per hour, elevation to 3,000 meters in 14 minutes; ceiling of 5,000 meters; sphere of action 3 hours; military cargo 290 kilograms.)

C–V, biplane, Hispano-Suisa motor, 450 horsepower, one Vickers machine gun, through propeller.

(Maximum speed 240 kilometers per hour, elevation to 5,000 meters in 20 minutes; ceiling of 7,000 meters; sphere of action 2 hours; military cargo 235 kilograms.)

The war organization of the Dutch Air Force is as follows:
Staff.
Three pursuit sections, each of 10 pursuit planes, 10 pilots, of whom one commands the squadron.
One independent observation section of 8 reconnaissance planes, 8 pilots, 8 observers.
Three groups, each consisting of staff, observation section (8 planes, 8 pilots, 8 observers), artillery section (6 planes, 6 pilots, 6 observers), radio section, photographic section.
One school section.

NORWAY

A. NAVAL

1. Organization of the navy.

During the fiscal year 1923–24, the expenses for strictly military purposes, in so far as the navy was concerned, amounted to 12,899,000 Norwegian kroner. A sum of 12,280,000 Norwegian kroner was proposed for the fiscal year 1924–25. (The latter sum being equal to $3,315,600—1 kroner=$0.27.)

The Norwegian Navy consists of the following: 4 ironclads (1897–1900), about 4,000 tons; 1 minelayer (1916, about 760 tons; 3 destroyers (1908–1909–1913), about 550 tons; 3 torpedo boats (1918), about 220 tons; 12 torpedo boats (1896–1913), about 100 tons; 14 torpedo boats (1896–1906), about 45 to 75 tons; 4 submarines (1909–1922), about 400 to 550 and 225 to 280 tons; 2 submarines under construction, about 400 to 550 tons.

Total: 4 ironclads, 1 minelayer, 32 torpedo boats, 6 submarines, besides several special ships and smaller vessels.

The permanent personnel amounts to 1,200 men.

The Norwegian Air Force consists of training and scouting planes, some constructed in Norway and some of which were purchased in England. The permanent air staff comprises about 60 officers and noncommissioned officers.

In the organization of the Norwegian Navy, the departments of administration and operations are distinctly separate. The Ministry of National Defense consists of the War and Navy Departments. The Minister of War, who may either be a civilian or a member of the army is in charge of all the affairs of the Ministry of War, but contrary to the Danish organization, he does not exercise any military authority. This latter is vested in the King, whose representatives are the admiral in chief of the navy and the general in chief of

the army. Both these authorities are individually responsible for military readiness and mobilization for the navy and army, respectively, and thus exert a certain definite influence on the different administrative divisions.

That section of the Ministry of Defense appertaining to the navy is called the Navy Administration and consists of two divisions, a military and a civilian section.

The head of the military section is a naval officer and this section is again subdivided into two offices, both in charge of a naval officer. These two offices deal with the organization and administration of the navy, training, recruits, and maintenance, etc.

The head of the civilian section is a jurist, and like the military section this is also subdivided into two offices, each being in charge of a jurist. These offices deal with cases of enlistments, criminal cases, accounts, and the pilot, signal, and light service.

Each of the two chiefs of division must submit all important matters to the minister.

There are nine commissions to deal with technical matters; they come directly within the navy administration and deal with questions submitted to them by the ministry of the admiral in chief.

Any technical questions of special interest must be submitted to the admiral in chief, who is thus given an opportunity to express an opinion on the matter in question.

The admiral in chief has the military command over the different corps, such as the officers' corps, the marine corps, etc., and he himself is the chief of the officers' corps.

Furthermore, the admiralty staff and, in all matters pertaining to command and mobilization, the commanders of the naval districts are directly subordinate to the admiral in chief. The admiral in chief also has charge of the assignment of naval officers and makes an annual report regarding the equipment and movements and operations of vessels of the navy.

All questions regarding mobilization, preparation, and readiness of plans for the use of the fleet in war, instructions to the commanding units, etc., are prepared by the admiral in chief and submitted to the Minister of Defense, who in turn submits them to the King.

The admiral in chief exerts a certain influence on all these questions, inasmuch as all matters of a military or administrative nature must be approved by him before being submitted to the minister. Some questions for which no grant is necessary are directly settled by the admiral in chief.

The admiral and the two chiefs of division thus often have to confer together, just as conferences between the admiral and the minister take place in all matters of importance. The most important, however, being settled in the cabinet.

The admiralty staff, whose head is a commodore of the first class, has to attend to all matters referred to it by the minister and the admiral in chief. All correspondence between the ministry and the staff must pass through the admiral in chief.

The work of the admiralty staff comprises all work having to do with the preparation and readiness of plans for war, all strategic and tactical matters, military science and international law, instructions and plans for maneuvers, target practice, drills and exercises, and training. The naval budget is prepared by the military section of the navy department and the chief of the section takes it up with the Minister of War after having consulted the admiral in chief. The proposal then goes to the Storting.

In order to develop the cooperation between the army and the navy there is a committee for the reorganization of national defense consisting of the Minister of War, the admiral in chief, the general in chief, the chief of the admiralty staff, the chief of the general staff, and in case of need experts from both branches of the service may be summoned. This committee meets twice a year.

Every spring the admiral in chief and the chief of the coast artillery confer to prepare the joint maneuvers of the fleet and the coast artillery.

The army and the navy have their own air forces, which are distinct from each other. Cooperation is insured through the presence on the committee of two officers from each service.

There are five naval districts, each under the command of a naval officer (rear admiral, commodore, or a commodore of the second class).

As previously mentioned, there are directly subordinate to the admiral in chief in all cases concerning command. In all other matters they are subordinate to the department of defense.

The organization of the personnel is as follows:

(*a*) THE PERMANENT STAFF

(1) The naval officers' corps, (2) the marine corps, (3) the artificers' corps, (4) the medical corps, (5) the quartermaster corps.

(1) THE NAVAL OFFICERS' CORPS

All questions concerning economy and education come within the jurisdiction of the Department of Defence; all other matters, as before mentioned, are dealt with by the admiral in chief who is the head of the corps.

The corps is divided into two categories—those receiving a salary, and those who do not. They are also called the "permanent" and the "conscript" officers.

Both categories receive their training at the naval academy at Horten. Those desiring to be members of the permanent corps must

pass the five-year course; the course for the "conscript" corps is three years.

The conscription officers (vaernepligtige officerer: compulsory enlistment; liable to bear arms) may advance to the rank of a captain if they take a short postgraduate course. They receive a small annual salary; by "after service" (eftertjeneste) they get full pay, and for sea service the same salary as permanent officers of the same rank. The proportion between the permanent and the conscript officers is 7 to 3.

(2) THE MARINE CORPS

This comprises the personnel of the rank of noncommissioned officers and privates for deck service and special service such as sailors, musicians, etc.

A staff officer is the chief of the corps. The corps is recruited by enlistment of unmarried sailors who are trained for the various branches of the service. After one year's schooling, the best men are picked out for further education as permanent noncommissioned officers. These may either be members of the enlisted personnel or reserves.

The admiral in chief appoints the salaried noncommissioned officers in accordance with recommendations from the corps, and he decides in each instance whether they shall be members of the enlisted personnel or reserves. A transfer can be effected to one of the other categories upon request.

The corps is divided into two companies—the school companies and the depot companies. The first company comprises all students and the noncommissioned officers specially ordered to the schools; the remainder of the corps belongs to the second company.

The students are distributed to the following schools: (1) The gunnery school (one and two years), (2) school for noncommissioned officers, (3) postgraduate course for noncommissioned officers.

The corps consists of 127 noncommissioned officers and 42 reserves.

(3) THE ARTIFICERS' CORPS

This corps comprises the technical personnel, stokers, gunners, torpedo and mine service, construction, etc. A staff officer is the chief of the corps recruited by enlistment of unmarried seamen with some training in the merchant marine. They pass through different schools and courses and can then be appointed to the rank of petty officers, either paid or unpaid.

This corps is also divided into two divisions—the students and the depot companies. The students are distributed to the following

schools: (1) Technical school, Horten. (2) torpedo school. (3) special course for submarine officers. (4) deck artificer branches.

The personnel of the submarines belong to the artificers' corps, but their position is somewhat different and their training is also different.

(4) THE MEDICAL CORPS

This comprises the personnel especially trained for the sanitary or hospital service and is made up of officers, noncommissioned officers and men. The corps is subject to mobilization requirements and is recruited from medical students. The chief of the corps is a medical officer with the rank of a commodore of the second class. The personnel is either paid or unpaid, as mentioned in the case of the other services.

(5) QUARTERMASTER CORPS (SUPPLY CORPS)

Comprises the personnel especially trained for this service and consists of officers, noncommissioned officers and men, recruited from young unmarried men having some office training. Besides accounting, etc., this personnel is employed on board ship for court-martial duties. The chief of the corps is an officer of the supply corps with the rank of commodore of the second class. The personnel is either paid or unpaid. There is no deck-officer organization.

(*b*) COMPULSORY ENLISTMENT

About 1,000 men are called annually for naval service: 900 men of these serve six months, and 100 serve three months: the last mentioned are detailed to the naval districts.

(*c*) MISCELLANEOUS

Ships of a limited size only, such as destroyers and submarines, can be built at the navy yard at Horten (also the naval station). This also takes charge of the docking and repairs of all the naval vessels.

The head of the navy yard is a civilian and is subordinate to the chief of the naval district: in time of war this latter has command of the fortifications of the district. In different ports along the coast, that is, in Bergen, there are smaller yards and depots which can undertake repair work.

Unfortunately for Norway, all the larger war vessels have to be built at private yards abroad. At the outbreak of the war this caused the loss of two ironclads that were being built at English yards; they were requisitioned by the English Government and used by England during the war.

PARAGUAY

A. NAVAL

1. Organization of the navy.

(Source: M. I. D.)

The naval establishment in Paraguay is under the Minister of War and Marine who is also at the head of the army. As part of the Minister of War and Marine's office, the "Ministerio," there is the Department of Marine, at the head of which is Commander Raul d'Laforet. This office corresponds to a general staff of the navy and handles all subjects which relate to the navy, such as personnel, material, instruction, marine engineering, shipyards, etc. Its personnel is as follows: Four navy officers, two civilian employees, nine enlisted.

ARMY AND NAVY ARSENAL AND SHIPYARD

This arsenal does work for the army and navy; however, its work is chiefly connected with the navy. It does repair work, makes castings, and builds small launches for the navy. It is expected that in the near future repair work on small arms can be done here.

The arsenal and shipyard is under a junior lieutenant of the navy. Its personnel is one officer, navy, 40 employees.

In addition there is a small shipyard at Puerto Sajonia near Asuncion, and storehouse for navy supplies. There is an improvised drydock where ships can be drawn out of water to be overhauled, scraped, and repainted. The personnel of the two consists of 2 officers, 3 civilians, 70 enlisted men.

The vessels consist of the following:

ADOLFO RIQUELME (GUNBOAT)

Length, 144.4 feet; beam, 23 feet; depth, 9.84 feet; draft, 5 feet; displacement, 420 tons; horsepower, two engines of 250 horsepower each; speed, 13 knots.

Guns.—Two Vickers, 76 mm.; two Hotchkiss, 56 mm.; two Maxim automatic, 37 mm.

Personnel.—Seven officers and 48 men.

TRIUNFO (PATROL BOAT)

Length, 108.25 feet; beam, 23 feet; depth, 6.56 feet; draft, 7 feet; displacement, 380 tons; horsepower, 350; speed, 15 knots.

Guns.—One Vickers, 76 mm.; two Maxim automatic, 37 mm.

Personnel.—Five officers and 38 men.

CORONEL MARTINEZ (PATROL BOAT)

Length, 65.6 feet; beam, 20.7 feet; depth, 6.56 feet; draft, 5 feet; displacement, 156 tons; horsepower, 200; speed, 11 knots.

Guns.—Two Armstrong, 76 mm.

Personnel.—Five officers and 30 men.

In addition there are four gasoline launches about 25 feet in length and speed of 9 knots capable of taking small detachments of troops up the Pilcomayo, Confuso, and other rivers emptying in the Paraguay.

Aircraft.—None.

All ships are based on Asuncion and this is the only base in the country. Ships can be fueled at Asuncion and Concepcion.

Total personnel.—Twenty-six line officers (ranking from ensign to commander), 2 staff department officers (ensign), 8 engineer officers (lieutenants (junior grade) and ensigns), 2 pay officers, 197 enlisted personnel of the line, 66 artificers and signalmen.

The training of the navy is very limited. Ships are usually anchored around Asuncion with an occasional trip up the Paraguay or Alto Parana River. Target practice is very limited. Discipline is good.

Pay.—For the naval officers, pay is the same as for corresponding ranks in the army.

	Paraguayan currency	United States currency per month
Commander	$5,000	$107.50
Lieutenant commander	4,000	86.00
Lieutenant	3,000	64.50
Lieutenant (j. g.)	1,850	39.80
Ensign	1,500	32.25

The pay of the petty officers varies from $100 Paraguayan ($2) to $600 Paraguayan ($12) per month. Sailors receive $40 Paraguayan or about 80 cents United States per month.

The ships are old and small, but their general condition and the ordnance is in good shape, and for river patrol boats they are most probably fairly efficient. Since the arrival of Lieut. J. A. Bozzano in Paraguay about two years ago from the United States he has done much to improve the general condition of the navy in overhauling and repairs. Lieutenant Bozzano recently graduated from Massachusetts Institute of Technology and has had two years practical experience in the United States Navy. Late increases in the navy have been in small craft such as gasoline launches for the purpose of transporting troops up the rivers of the Paraguayan Chaco.

The department contemplates constructing several more larger launches for the same purpose.

PERU

A. NAVAL

1. Organization of the navy.

[Source: M. I. D.]

(*a*) NAVAL POLICY AND SYSTEM

In Peru, a country governed almost entirely by military leaders ever since its independence, and where internal disorders and revolutionary plots have been much more frequent and threatening than external strife, the navy was for a long time largely overlooked as the first line of defense, at least until after the War of the Pacific. In that conflict the navy, such as it was, rendered a most valuable account of itself, but it was soon enough entirely wiped out, and the Chilean forces landed at Chorrillos, near Lima, without further opposition from the sea. The War of the Pacific can be given, therefore, as the date when Peru first realized her real need for a navy, and when first the idea of adopting a definite naval policy was advanced and considered.

Peru's need for a navy is most pressing. With a coast line of some 1,400 miles, and with most of her centers of industry and population near this coast, and with a topography which makes movements from point to point along the coast practically an impossibility except by way of the sea, the need for a mobile coast defense, such as only a navy can furnish, is obvious.

So small is the navy at present, however, that its mission in the national defense does not go beyond the defense of Callao, the port for Lima. Peru's recent purchase of two submarines is her first step toward the development of her present policy. The navy will stay entirely on the defensive. But with submarines, destroyers, and fast light cruisers she will endeavor to keep enemy fleets or transports from approaching Callao. If troops land any place else, as well they may, the defense of Lima is left to the army. In the plans for a distant future, Peru hopes to have a navy which, still acting entirely on the defensive, could furnish some coast defense all the way from Mollendo to Paita.

It is believed that the Peruvian Navy ranks fourth in size and efficiency among the navies of South America. The three nations whose navies are undoubtedly larger than and superior to the Peruvian Navy are Argentina, Brazil, and Chile.

(*b*) ORGANIZATION AND COMPOSITION

The Peruvian Navy consists of the following vessels:

Cruiser *Almirante Grau*, built at Barrow-in-Furnes, 1906, shipyards of Vickers Sons & Maxim (Ltd.); gross tonnage, 3,220; maximum speed (last test since conversion), 24.23 knots; economic cruising speed, 10 knots; fuel, oil (converted into an oil burner in Panama, 1924–25); draft, 16 feet; armament, two 152-mm. (6-in.) and eight 76-mm. (3-in.) guns, all Vickers; two 37-mm. (1½-in.) machine guns, and two 18-inch torpedo tubes. Also equipped with 124 Mauser rifles, Argentine model, in poor condition. Complement, 19 officers and 241 men. Equipped with "Federal" radio system; transmitter "Arco" system, type CT 1517, condition good, maximum range 500 miles. Receptor, two-stage amplification, type SE 3650, condition good. Vessel in good repair and entirely seaworthy.

Cruiser *Colonel Bolognesi*, built in shipyards of Vickers Sons & Maxim (Ltd.), Barrow in Furness, 1907; gross tonnage, 2,145 tons; maximum speed before conversion, in test, 24.587 knots; maximum speed since conversion not known; economic cruising speed, 11½ to 12 knots; oil burning; converted to oil burner at Balboa, Panama, 1925; cruising radius, at 12 knots, 2,050 miles; draft, 15 feet 3½ inches; armament, two 152 mm. (6 in.) and eight 76 mm. (3 in.) guns, all Vickers; two 37 mm. (1½ in.) machine guns, and two 18-inch torpedo tubes. Also equipped with 117 Mauser rifles, Argentine model, in poor condition. Complement, 18 officers, and 258 men. "Arco" transmitter, model "K"; receptor, regenerative, two valves "audiofrequency." In practical test communications effective up to 1,200 miles. Vessel in good repair and entirely seaworthy.

Gunboat *Lima*, built in Kiel, Germany, in 1881; gross tonnage, 1,783 tons; maximum speed, 12 knots; economic cruising speed, 9 knots; coal burning; cruising radius, 2,700 miles; draft, 16 feet; armament, four 101 mm. (4 in.), and four 47 mm. guns, all Vickers. Also equipped with 42 Mauser rifles, Argentine model, 1891, in poor condition. Twelve officers and 114 men. Radio, "Federal" system, "Arco" transmitter type CT; three-valve receptor, one detector and two amplifiers; system installed in Balboa in 1919, actually in poor condition. Vessel not in good repair, and not considered seaworthy. (If possible to put in seaworthy condition, this vessel will be assigned as mother ship for the submarines.)

Destroyer *Teniente Rodrigues*, built in Chalon Sur Saone, in 1910; gross tonnage, 462 tons; maximum speed, acceptance test, 28 knots, most recent tests 20 knots; economic cruising speed, 10½ knots; coal burning; cruising radius 950 miles; draft 3 meters or 9 feet 10 inches; armament, six 65 mm. guns and two 18-inch torpedo

tubes. Eight officers, 78 men. Wireless receptor, Westinghouse, deficient; transmitter, airplane apparatus, functions with motor of 1½ horsepower, provisional installation, deficient; maximum range. 120 to 130 miles. Vessel in fair state of repairs, and seaworthy. Conversion to oil burner contemplated.

NOTE.—All the above vessels are at present in Callao.

Submarines *R–1* and *R–2*, built in Groton, Conn., U. S. A., by the Electric Boat Co. The *R–2* was launched March 29, 1926, and the *R–1* July 12, 1926. "Holland" type, 200 feet long; displacement 800 tons; speed, submerged, 10 knots; surface, 14½ knots. These submarines are still in American waters. The *R–2* was officially delivered to and accepted by the Peruvian Government on July 30, 1926. The *R–1* has not yet been delivered.

In addition to the vessels named above, the navy has a river flotilla of four launches, or river gunboats, on the Amazon at Iquitos.

(*c*) NAVAL AIRCRAFT

The school of naval aviation has the following planes: 2 Douglas, just received, excellent condition; 5 HS–2, of which 3 are serviceable; 3 Boeings, of which 2 are in good condition; 2 Curtiss Sea Gulls, dismantled.

Personnel.—Twenty officers and 110 enlisted men.

(*d*) PERSONNEL

The number of officers by grades is as follows:

	Active	Retired	Total
Rear admiral	0	3	3
Captain	7	14	21
Commander	32	11	43
Lieutenant commander	42	6	48
Lieutenant	43	9	52
Lieutenant (junior grade)	24	17	41
Ensign	22	11	33
Cadet	66	0	66
Total	236	71	307

The number of enlisted men is 1,390

The officer personnel of the Peruvian Navy is confined exclusively to graduates of the naval academy. The cadets now in the academy form what is easily the finest body of young Peruvians to be found in the Republic. In a few years, under the American Naval Mission, the school has been put on such a basis that it is considered an honor for the sons of upper and middle class families to enter it. The graduates are entirely competent officers, and will rapidly leaven the entire officer personnel of the navy. Among the older officers, com-

missioned before the contraction of the mission, are some very competent and trustworthy officers. Also there is a certain percentage of incompetent, untrustworthy, and scheming officers, who had played politics for their appointments and promotions. Taking politics out of the navy has been one of the biggest tasks of the Naval Mission. It continues to be a problem to watch very closely. It is hoped that as the younger officers, graduates of the academy since its rehabilitation by the mission, form a larger percentage of the officer personnel, that politics will be more and more eliminated.

The enlisted personnel are conscripts. In each annual draft drawn by the Army's Regional Services, the navy is proportioned the number of conscripts it requires. The navy is even allowed some selection, and its men are either those who desire the service, who have had experience in handling small boats and know something about the sea, or who are selected because of physically good appearance. The navy's physical requirements are more strict than the requirements of the army's examining surgeons, with the result that the navy each year finds a certain percentage of its conscripts to be physically unfit, even after they are passed by the army doctors.

Each annual draft reports first to the naval academy, where the new conscripts receive a brief course of instruction before they are sent to the ships or their other duties. The navy has a good enlisted personnel, but mostly lacking in experience. There does not seem to be sufficient inducement to reenlist. While the higher grades are naturally filled with men of some experience, the junior noncommissioned officers are perforce selected from men with too little service.

The present promotion of officers is partly by seniority and partly by selection. An "organic law," which will deal with the subject of promotion, is just now one of the main subjects of study in the Ministry of Marine. A certain amount of selection is certainly essential at the present time. The ultimate hope is that the promotion in the Navy can be put on a straight seniority basis.

There are several stages of retirement. There is a small group of officers who have passed the age limit at which retirement is compulsory, but since these officers are veterans of the War of the Pacific, they are kept on an active status by special law, in order that they may draw active-duty pay. Another group are in the status of "disponibilidad transitoria," temporary unavailability. This group is composed of officers who are serving in other capacities, such as Captain Olivora, who is Prefect of Cuzco, or Commander Rivero, who is a national deputy, or officers who request to be put on this status. An officer in this status may not receive a promotion, but he may return to an active-duty status, if he resigns his other position,

and then is available for promotion. A third group are in the status of "disponibilidad definitiva," definite unavailability. All officers who do not return to active duty from the status of "disponibilidad transitoria" within five years pass automatically to the status of "desponibildad definitiva." Other officers in this group have passed the age limit for their particular grade. A fourth group are "retired." The difference between the last two groups mentioned, i. e., retired officers, and officers in "desponibilidad definitiva," is very slight and difficult to define. I understand that officers on the list of "desponibilidad definitiva" may, at the option of the Minister of Marine, be returned to an active status, if necessary for the service, whereas officers on the retired list can not again be called to active duty, except, of course, by special act of Congress.

The retired pay of Peruvian naval officers is figured on a basis of thirtieths. A retired officers receives as many thirtieths of the base pay of his grade as he had had years of active service prior to being retired. Thus an officer who retires after more than 30 years active service receives the full pay for an officer of his grade.

The pay of naval officers is as follows:

	Peruvian pounds per month
Vice admiral (none since death of Villavicencio)	140. 0. 00
Rear admiral	100. 0. 00
Captain	80. 0. 00
Commander	67. 2. 50
Lieutenant commander	50. 0. 00
Lieutenant	40. 0. 00
Lieutenant (j. g.)	26. 7. 50
Ensign	22. 6. 00

In addition, the following gratifications and allowances: Flying pay, extra pay for duty with submarines, allowance for service in Amazon River flotilla, and allowance for large families, four or more children.

(*e*) GEOGRAPHIC DISTRIBUTION

Normal distribution.—All vessels except the four launches of the river flotilla are normally stationed in Callao, the defense of Callao being the principal mission of the navy.

Present distribution.—Same as above for all vessels except the two new submarines *R–1* and *R–2*, which have not as yet left American waters.

(*f*) NAVAL BASES AND REPAIR INSTALLATIONS

Under the same contract which covered the purchase of the two new submarines, the Electric Boat Co. is building a new submarine base on San Lorenzo Island, Callao Harbor. The plans call for

the erection of two new piers, the second one 200 yards from an old pier built some years ago, and also certain houses, warehouses, shops, etc. The work is practically completed, but has not been officially turned over to and accepted by the government as yet.

The navy does not own a dry dock, but the floating dry dock of the Peruvian Steamship Co. is anchored in Callao Harbor just off the new submarine base, and this dock is used by the navy when necessary.

The fuel and general naval stores will also be located on San Lorenzo Island from now on, except the supply of powder and explosives. The navy has built a storehouse for explosives near Ancon, but some few miles from the hydroaviation station. This storehouse has been connected with Ancon by standard gauge railroad.

NOTE.—*Further notes on the organization of the Peruvian Navy may be found in the May "Bulletin."—Ed.*

RUSSIA

A. NAVAL

1. Activities in the Baltic.

[Source: M. I. D.]

The Russian season for naval training commenced rather late this year; no naval activity was reported from the Esthonian or Finnish observation stations until well into June. During July, battleships, destroyers, mine layers, and submarines have been continuously operating in the Finnish Gulf to the west of Kronstadt. The most significant fact in connection with the status of the Russian Navy this year is that apparently the *Gangut* is now in commission. (*Gangut* being a battleship of 23,400 tons, twelve 12-inch guns.)

The *Gangut* has been reported several times during the last year as under repair, but details were insufficient to warrant the conclusion that she would be ready for sea at this time. The work was carried out apparently chiefly during the spring, for very reliable reports last winter indicated that the work already undertaken has been stopped. Identification of the *Gangut* is not as yet positive, but it appears to be extremely probable. It has been two or three times reported within the region of the Finnish station on Seiskar Island; at least the *Marat* and the *Parishkaya Kommuna* have been identified, and subsequently at such a time that it could not possibly be one of these ships, a third ship of identical type has been noted. Whether or not the *Poltava* is under repair is not known. (*Gangut*, *Poltava*, *Parishkaya Kommuna*, and *Marat* are sister ships.)

No extensive training cruises of the sort that took place last year when the Baltic Fleet went to Kiel will be carried out during the present navigation season so far as available information shows.

RECENT ACTIVITIES

June 27: Seven destroyers (five *Orfei* type and two *Karl Marx* type) reported from Stenskar, proceeding west. They made a short trip to the longitude of Reval and returned.

August 9: Three submarines (*Bolshevik* type, tonnage 650 to 790) proceeding west off Stenskar; later in the day three *Marat* type battleships and six *Orfei* type destroyers were seen proceeding in the same direction.

August 12: Three submarines were seen off Ristna, proceeding east; 3.45 a. m. on the same day three *Marat* type battleships and six *Orfei* type destroyers were seen northeast of Eckholm (Esthonian station), sailing course east. This would have given time for the squadron reported from Stenskar on the 9th to have made a short cruse in the Baltic to a point between the entrance to the Gulf of Riga and Libau, and to have returned.

Early in July the S. S. S. R. (ex-*Aurora*) was reported in the southern Baltic off Libau. (Cruiser, 6,000 tons, completed 1909.)

NOTE.—*Karl Marx* type and *Orfei* type destroyers are both classed as *Noviks*. *Karl Marx* type are about 30 feet longer, and have one more gun forward. Specifications.—*Kark Marx* type: Length, 344 feet, approximately; five 4-inch guns; one antiaircraft gun; nine torpedo tubes mounted triple. *Orfei* type: Length, 314 feet; four 4-inch guns; one antiaircraft gun; nine torpedo tubes mounted triple.

(The Esthonian *Lennuk* and *Wambola* are sister ships of the *Noviks*, the *Lennuk* being of the *Karl Marx* type and the *Wambola* of the *Orfei* type.) There is so little difference between the two types of *Noviks* that an absolute identification of either type as distinguished from the other is very difficult.

There is no further information concerning the present status of the *Internationale* (ex *Rurik*). On the basis of such bits of information as I have received, my own belief is that the *Rurik* is not at the present time in commission. (Armored cruiser of 15,200 tons, completed 1908.)

It is possible that the *Profintern* (ex *Svietlana*) is in commission. She was reported from a Finnish station at a great distance from the observation point on August 3, but whether or not the identification was exact is not known. The Finnish Naval Staff is cer-

tain that the *Profintern* is in commission but will not guarantee its identification so far this year. (Light cruiser, 7,600 tons; laid down 1913, completed 1925; fifteen 5.1-inch guns.)

The small old gunboat *Krasnoye Znamye* is also in commission and has been reported in the Baltic this year.

The Russian ships noted above have been reported by Latvian stations as off Libau on August 11; one report stated that the submarines were in difficulties, but they seemed to get back all safely.

SPECIAL ARTICLES

1. REVIEW OF THE STATUS OF NAVAL AERONAUTICS

[Source: German "Marine Rundschau"]

It has become impossible to treat of naval policy, naval budgets, ship construction, and the activities of the fleet without including air navigation in our considerations. As things now stand, it is impossible to form a correct idea of the relative strength of the fleets of different nations without an exact knowledge of the development of air navigation. This applies not only to the special air forces which are attached to the Navy but also to the general development of aviation in all its branches, because this latter is gradually acquiring an increasingly powerful influence on the naval armaments of all countries.

At the present moment it is an open question whether seacoast defense can be more effectually assured by naval or aerial armed forces; whether coast artillery is more efficacious than bombing airplanes; whether preference should be accorded to the airplane carrier or to the usual type of ship. Opinions are divided upon all these subjects between the representatives of the older and the younger schools. The present conditions are such that, besides being bound by mutual agreements, the great powers are very cautious about building new types of ships, none of them having any desire to pay the price for experiments by which other nations will profit. Consequently the decrease of naval ship construction runs parallel with the growth of the air weapon. Supremacy on the seas has ceased to be dependent upon the efficiency and number of ships, and the extraordinary development of the air weapon with its unparalleled variety of possibilities has completely obscured the question of the superiority of naval power, which had hitherto been clearly and plainly defined by a power standard. Aviation as a weapon of war has opened out an untrodden field of tactical and strategic possibilities. By using single individuals instead of masses and by em-

bodying the principle of "small stakes and powerful effects" it has increased the significance of the imponderable and indefinable factors of naval warfare to such an extent that we are at present hardly able to form an adequate judgment as to the probable issue of any naval action.

This uncertainty is the cause of the nervousness and vacillation prevailing in all questions of armament. Our former standards of estimate have become worthless; we have no formula for the determination of military values. One point, however, seems to be clear: The aerial weapon can not decide the issue of a war. It is of no use for the occupation of enemy territory; but on the other hand it is the most efficient weapon of defense and of inestimable value for the weaker combatant because the other side has no choice but to follow the lead of its weaker opponent. Air forces can only be repulsed by air forces, and if France, for instance, builds a powerful air fleet, England will be obliged to do the same, with the result that, owing to financial limitations, she will have to restrict her naval ship construction, much against her own will.

The rate of development of the airplane—both as regards number and quality—outruns by far that of ship construction, and the rapidly growing destructiveness of the aerial weapons of attack has reduced the term of the military efficiency of warships to so short a period that a warship may become obsolete before it is completed. Obviously the military risk involved in the construction of a warship increases with the time needed for its completion; therefore the larger the ship the more hazardous it becomes to build it.

It is an open secret that the naval policy pursued by France can be expressed in two words—submarines and aircraft. The structure of the numerically inconsiderable French Navy is governed by this strategic and tactical principle, which is fully justified by France's geographical position, the range of action of the above-mentioned weapons being sufficient for the waters lying off the French coasts, the channel and the Mediterranian. This is a striking instance of the influence of geography on the structure of the navy.

It is comprehensible that aerial armament has become the subject of vehement discussion in all naval budget commissions and that all countries show an unhesitating willingness to make great financial sacrifices in order to promote its development. The necessity of air forces for the navy and the importance of a close cooperation between the two is insistently advocated by British and American naval authorities. No ship and no navy can be regarded as adequately armed unless it is provided with aircraft. These latter form as indispensabe a part of naval armament as guns or torpedoes and they must be accorded an equal place in naval equipment. In order to

command a fleet, a naval officer must have as complete a knowledge of the functions and activities of aircraft as of those of torpedoes and submarines. The naval air fleet must become an inalienable part of the navy. The special functions of the air fleet are defined as follows: Flight practice in cooperation with other naval units is vitally important for the training of the fleet. Naval aviation is a special branch requiring not only the comparatively simple knowledge of oversea flight but also that of the very complex problems of the adaptation of aircraft to the practical conditions of naval warfare. Considerations of attack and defense in naval maneuvers require that aircraft should be available for use at a distance of 1,000 miles from their land bases; their operations must be planned out in close connection with those of the fleet and it must be possible to launch them from surface ships. The equipment of the air forces for the above-mentioned purposes of attack and defense must include their stowage, service, and repairing on board surface ships, as well as the mechanical details for their reliable operation over water. The most important question of all, however, is the training of the personnel both in the air and on the water. The chief functions of naval aircraft may be enumerated as follows: (1) Observation of ship artillery fire; (2) scouting, observation, and reporting of the movements of the enemy fleet; (3) bombing in cooperation with the naval command; (4) torpedo operations singly and in cooperation with torpedo-boat and submarine attacks; (5) action against enemy aircraft; (6) patrolling of naval escorts; (7) protection of naval bases; (8) training of flyers; (9) various minor functions. The most important of these operations is bombing, which is qualified in the following terms:

> At the present time (end of 1925) the airplane has attained a degree of efficiency which qualifies it for bombing attacks not only against smaller ships but also against the largest battleships. It is probable that airplane construction and bomb production will improve more rapidly than antiair defense or the underwater protection of battleships. It is a general rule in aviation that to-day's highest records are no more than to-morrow's average performances. The bomb is the airplane's chief weapon of attack and a bombing squadron is the nucleus of an air force. It is therefore of the highest importance to apply all our efforts to the development of the bombing airplane and the improvement of bombing technic.

The growing application of this new weapon will obviously have an enormous influence on all naval problems relating to ship construction, navigation, strategy, and tactics. This influence is chiefly manifested in the development of the airplane carrier—a new type of ship which has been especially perfected in England. The experiments made in that country have shown that the most suitable type of ship for this purpose is that of 14,000 to 18,000 tons. The United States will shortly complete the construction of the two

largest existing airplane carriers (33,000 tons) whose efficiency will have to be tested by experience. France is building an airplane carrier whose completion seems to be delayed by the desire to profit by the building experience of other countries.

Great Britain has two airplane divisions consisting of 61 squadrons, besides a number of training divisions. These squadrons are stationed in the southern and eastern districts at distances not exceeding 50 kilometers from the coast; they have a speed of 120 to 250 kilometers per hour and can successfully repulse attacks at heights of 2,000 to 6,000 meters, provided the warning signal is given 30 to 40 minutes previously. London is provided with even more favorable conditions of defense. The actual strength of the British air forces consists at present of 33½ squadrons for home defense, 9 squadrons for the naval air fleet, and 18½ squadrons distributed in foreign stations. Each squadron consists of 12 airplanes. Special bombing airplanes for coast defense are being constructed, each of which will carry two 1-ton bombs. The smaller scouting airplanes carry a bomb weight of 600 kilograms to a height of 5,000 to 6,000 meters.

France.—The unsatisfactory progress of aviation, which was especially noticeable in the last maneuvers, was much commented upon in the course of the naval budget discussions. Last year's appropriations had amounted to fifty-four millions for new constructions and an almost equal sum for upkeep and other needs; but the fact that these large sums have even been expended was a proof of the backwardness of French aviation. There is no doubt, however, that France has made very considerable progress both in technic and in flight performance. She attaches such a high importance to this special class of weapon that the creation of an air force large enough to satisfy her ambitions will undoubtedly require some time. The development of the naval air forces has not hitherto held pace with that of the army air forces, but it is probable that in the coming year the first proposed stage of progress will be attained—namely, the air forces will be brought to a total of 50 squadrons of 12 airplanes each. There is a strong prevailing tendency to furnish the greatest possible number of ships with airplanes; each of the three new cruisers of the *Primauguet* class is to be provided with six airplanes. The French fleet does not possess any airplane carriers and there seems to be considerable hesitation as to the best way of completing the construction of the future airplane carrier *Bearn*. These deficiencies are apparently to be supplied by establishing airplanes on all naval ships down to torpedo boats and dispatch boats. This plan will undoubtedly work satisfactorily in view of the special

functions for which the airplanes are designed. (Submarines with swarms of airplanes will speak the last word in the Mediterranean, which will be crossed by French airplanes as a matter of course.) The French plans are favored by the existing geographical conditions, strong air stations being available or under construction at Bizerta, Algiers, Oran, and Toulon and in the island of Corsica.

The following is a résumé of the French viewpoint on the functions of the French Navy and air forces in the Mediterranean:

Air stations are much more needed at the present moment than the obsolete naval squadron. (The French chief commander is a strong advocate of the airplane as a weapon of war and favors the cooperation of great numbers of airplanes in all naval maneuvers.) The extensive field of action and future possibilities of the airplane justify the opinion that future naval battles in the Mediterranean will not be decided by artillery. Victory will be achieved by the one of the two opponents who has the most powerful air force at his command. The naval battles of the future will be preceded by battles in the air, and it is possible that battleships will have nothing more to do after heavy bombing airplanes have been at work. It is indispensable that the new cruisers should be furnished with more powerful airplanes.

Experiments were made last year with the Farman super *Goliath* with a view to ascertaining the limit weight of bombs which it was able of carrying. The super *Goliath* weighs 7,000 kilograms and carries a useful load of 4,500 kilograms. The fuel supply (2,100 kilograms) furnished a 10-hour flight with an average speed of 180 kilometers. The experiments showed that this airplane could carry 5,000 kilograms of bombs to a distance of 1,000 kilometers. The smaller bombing airplanes also furnished very satisfactory performances. It may be gathered from the results of these experiments that every bombing airplane can carry a minimum bomb load of 1,500 kilograms, a medium airplane 2,500 kilograms, and a large airplane 5,000 kilograms.

Italy.—A law issued in May, 1925, establishes the following standard for the Italian air forces: (1) An independent air fleet consisting of 78 echelons; (2) an army air fleet of 57 echelons; (3) a naval air fleet of 35 echelons consisting of 10 airplanes each; (4) a colonial air fleet of 12 echelons; total, 182 echelons. The personnel must be increased to 2,000 officers and 20,000 men. This plan is to be realized in the course of five years. In the summer of 1926 the air fleet will consist of 90 echelons with 900 airplanes. The 35 naval echelons will be furnished with seaplanes; 6 of them will be attached to the navy. The remaining 29 are designed for coast defense.

Russia.—On the occasion of the eighth anniversary of the Soviet Government the chief of the naval air forces gave a lecture on the progress of aviation. He spoke of the great efforts which had been

made and which had been crowned with appreciable success. Although Russian motor construction was still dependant upon foreign import, this dependance would soon cease owing to the extraordinary progress of Russian technique in this particular branch. Airplanes participated in last year's summer and autumn naval maneuvers. By cutting down the numerous and extremely exaggerated reports of the present condition of the Soviet air fleet, we can extract the following data relating to the middle of last year and which are probably approximately correct: 987 airplanes (including seaplanes) were in commission, of which 625 were observers, 296 fighting airplanes and 66 bombers. They are organized into echelons of 12 airplanes each, 4 of which are reckoned to the reserve. According to this schedule, the air fleet consists of 98 echelons, but few of these are actually filled up and the whole plan is not much more than a framework. The majority of airplanes are distributed over European Russia. The names of 1,214 flyers are entered upon the official lists, of which 784 are pilots and 430 observers. The Baltic Sea fleet has been furnished with 18 echelons, which, however, only include 60 airplanes and are therefore also nothing but a framework. The Black Sea fleet has 100 airplanes of which 65 are said to be quite up to date.

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2. VARIOUS OFFENSIVE METHODS AT SEA DURING THE WORLD WAR.

(By First Lieut. F. K. Foss, of the Danish Navy)

We know that the different methods employed by a fleet when attacking a coast fortification are divided into the following: Blockade, bombardment, artillery attack, carrying by assault.

The naval events of the World War, and particularly the fighting between the fleets and the coast fortifications have, however, shown that such a classification can no longer be fully maintained, which I shall try to prove in the following article.

During the World War actions have taken place between naval forces and coast fortifications at the Dardanelles, the coast of Flanders, Dagoe Oesel, and Kiau-Tschau.

At the two last-mentioned places the action was quite unimportant and in the case of Dagoe Oesel, especially, very little is known about the operations; but the naval operations at the Dardanelles and in the English Channel furnish sufficient material for the following study.

BLOCKADE

The task of the aggressor is to prevent the object defended by the coast fortification receiving supplies from outside. Therefore the task of the coast fortification is to keep the blockade line as far off as possible by means of its long-range guns, as by so doing the aggressor is forced to employ a great number of ships for keeping up the blockade, and the larger the base for the blockading ships the greater the chances of the blockade runners getting through unobserved. The constantly increasing speed of the ships also concurs in favor of the blockade runner, particularly at night. When night falls the blockade service is undertaken by the smaller ships, the larger ones having to withdraw, owing to their being too easy a mark for the torpedo attacks of the defending forces.

For these reasons, even before the World War, a really effective blockade was considered a rather difficult task, and by now the submarines have made it impossible for any large ship to appear before the coast fortifications (which are well defended), and the blockade as hitherto effected is no longer practicable.

In this connection it is interesting to learn that Admiral Bacon, in charge of the Dover patrol service, writes as follows in his book regarding the patrol operations:

> A blockade at night 4 or 5 miles off the coast of the enemy is, when directed against modern fast ships, a fiction and a farce.

It was thus imperative to invent new methods, when, for example, during the World War, England desired to blockade Germany. Small cruisers, torpedo boats, etc., maintained the coast blockade and the neutral traffic at the ports was subjected to strict control.

The Germans were in control of the Baltic and the Baltic trade with Germany consequently evaded Entente control. Care was taken that the countries bordering on the Baltic did not receive any more supplies from aboard than were necessary for the needs of the country itself, and the British fleet controlled all neutral traffic with the Scandinavian countries.

The blockade of the North Sea coast was effected by patrols, mines, and the capturing of German tonnage on the open sea where England was in control.

The sufferings in Germany caused an interesting phenomenon; that is, the counterblockade of England. This was a new phase; never before had the weaker power (which was being blockaded) blockaded the stronger power at the same time. It was the submarines, the weapon that stamped the course of the whole war, that made it possible for the Germans to do this. The Germans stationed their submarines along all routes generally used on the high seas,

and at a certain period of the war they sank all the ships, no matter whether they were the property of belligerent or of neutral countries, or whether they were naval vessels or merchantmen. As this work was carried out with an incredible zeal and genuine German thoroughness, it caused England enormous losses, and when Admiral Jellicoe and the commander in chief of the American Fleet, Admiral Sims, conferred as to how the United States could best assist, the former pointed out that in the course of six months (from February 1, 1917) England had lost 3.5 millions of tonnage, and he furthermore made no secret of the fact that if this condition of affairs did not soon come to an end, England would lose the war.

There was, however, no lack of methods to avoid or combat the submarines, but this all took some time to put into execution. Attempts were made to distribute the traffic over extensive areas instead of following the usual highways. English officers in foreign ports who were in constant communication with the intelligence service at home indicated the route to every ship immediately before its departure—where and how to go, etc. The development of anti-submarine weapons increased at a furious rate. Special guns were used for attacking submerged submarines, special projectiles, smoke screens for the use of merchantmen, depth charges, hydrophones, armed merchantmen, airplanes for locating submarines, decoy ships, submarine nets, and convoys.

England desired the United States to furnish immediately torpedo boats, patrol boats, etc., small vessels for the patrol service, and at least 100 destroyers.

This brief sketch of the modern blockade and the combatting of it will probably be enough to show that the coast fortification does not enter into the question, and that its particular task, that up to the present time of employing its long-range guns to keep the blockade line at a distance, no longer exists, as no ship will venture into the proximity of the coast fortifications (the base of the fleet).

Seen from the point of view of the coast artillery, it will be impossible to carry out a blockade, as the combatting of it will fall upon the naval forces of the defending power.

Even if this form of the blockade was purely a phase of the World War, there is no doubt that the future blockades will assume the same form, as the change is not due to the effect of local or temporary circumstances, but to a new weapon, the submarine.

BOMBARDMENT

The task of the attacking power is to carry out a violent bombardment of the fortifications, to destroy them, or, in the case of a town, to force it to surrender.

It is evident that this form of attack can only be used when the range of the naval guns is greater than that of the guns of the fortifications, or when the attack follows an artillery attack which has destroyed the fortress.

As the sea fortifications are usually not as modern in equipment as the attacking fleet (their guns as a rule not having such a long range), this deficiency can often be remedied by locating the fortifications at a greater distance from the object they serve to defend, so that a bombardment is impossible without first compelling the attacking power to make an artillery attack. It must be remembered, however, that this makes the fort line longer and that therefore the forts become rather isolated, if their number is not increased, and the defense is thereby less capable of resistance.

During the World War a fleet bombardment was executed only in the channel between England and France where the English Dover Patrol, so to speak, daily bombarded the Belgian Channel cities held by the Germans and used as submarine bases, and therefore defended by numerous coast fortifications (about 35). In this case the task was particularly difficult, as the objects were not the Belgian cities but their harbors, docks, etc.

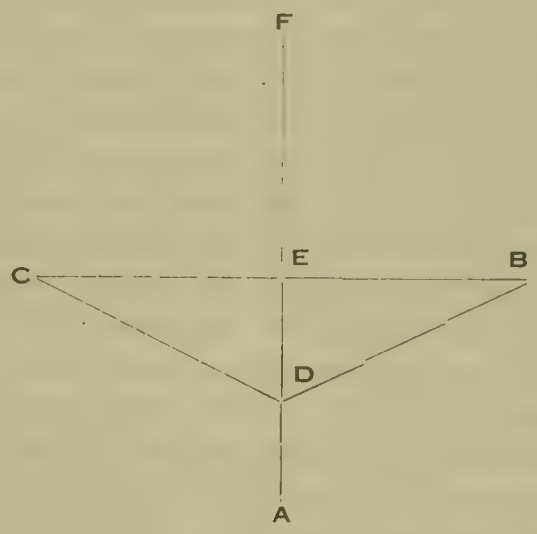
The only change in bombardment brought about by the World War was that it can be effected at a greater distance than before. Besides the range of the guns, the distance of the bombardment is also dependent on the possibility of making observations, and before the World War it was thus supposed that the future bombardments would not exceed 10 to 12 kilometers. Viewed theoretically, the airplanes and airships should make the possibilities of reconnaissance unlimited, and the distance of the bombardment dependent on the range of the guns alone. Practice shows, however, that bombardments are still carried out only at distances not exceeding 15 kilometers.

As arguments against the possibility of an effective naval bombardment there were formerly alleged the ships' small supply of heavy ammunition (armor-piercing shells). This is still true in part, but it must be remembered that on a modern ship every heavy gun has at its disposal 150 to 200 projectiles, and the encounters at the Dardanelles show that a fleet is always supplied with the ammunition best suited for the purpose (the ships even carried shrapnel).

The precision firing of the Dover patrol against the Ostend and Zeebrugge docks is a typical example of bombardment. Here was a direct attack of the object; the fire returned by the coast fortifications during the bombardment was only of secondary importance. As previously mentioned, the bombardments were carried out under difficult conditions, and as the guns of the coast fortifications had a very long range, scouting and reconnaissance work represented

the greatest difficulty. It should be mentioned that this difficulty was overcome by the now familiar "tripod" observation stations, and the bombardments were successful, as both Ostend and Zeebrugge capitulated as German submarine bases.

I shall now describe briefly the method employed by the Dover patrol for carrying out bombardments at night which seems to make it possible for a fleet to gain effective results when the object is large in extent, that is, a city, etc.



In the above diagram *B* is the middle point of the area which is to be shelled, and the range is 10 kilometers. The course of the bombarding ship is the line *A–D–E–F* where *A* and *C* are marked by searchlights. *E–C and E–B* are 10 kilometers each and form each a right angle with *A–E–F*.

In the above diagram the firing ship takes departure from *A* and steers along *A–F*. The target bearing instrument is kept trained on *C* and by using 360°, minus the relative bearing of the target bearing instrument, as the bearing for the starboard guns, rather an effective bombardment can be accomplished at night, providing of course that the firing ship can hold a steady course. The range is that of the firing vessel to *C*.

If such an enterprise is to be successful, then the torpedo boats and submarines of the defense do not enter into the engagement.

As above mentioned, a fleet bombardment only took place on the coast of Flanders, but, nevertheless, in some cases the attack of the allied fleets on the Dardanelles has been considered as a bombardment. This is, however, quite wrong. The whole of this naval action was purely an artillery operation or engagement. The forts were the aim of the ships. The error is bound to arise in mistaking the preceding operation for a real artillery attack.

ARTILLERY ATTACK

The common attack on coast batteries is called an artillery attack. If the object is well defended, the artillery attack will be the most natural form of attack, as the long-range guns of the fortifications will prevent the attacking fleet from any performance at all before the forts have been disabled. The artillery attack was therefore repeated over and over again during the World War—at the Dardanelles, the coast of Flanders, Dagoe Oesel, and Kiau-Tschau.

Before the World War fire was always directed against the guns, and the complete destruction of a fortification was doubtful, as the guns were the only vulnerable part and were very small targets if the distance was great. For this purpose the ships' fire was much too unsteady and their supply of ammunition insufficient.

Therefore in the future we must be fully prepared for an attacking fleet to make serious attempts at a total destruction of everything against which it might have to contend. To what extent this will succeed will depend upon the possibilities of making observations. Unfortunately, for those who want to learn from the war, this furnished no experience regarding an engagement between fleet and coast batteries, and it is these latter that offer the easiest targets, while the necessary observation work is not especially difficult, as they can not be hidden or camouflaged. But the observation work is more difficult for the fleet than for the fort, as the hits of the former do not show up as distinct water columns.

Also to fight coast fortifications is a difficult task for the ships, as the latter have very seldom had an opportunity of sending out the necessary observers. The World War only furnished one example of a coast fortification being destroyed by ships' guns alone—namely, Sedd-el-Bahr at the entrance to the Dardanelles. This was largely due to the fact that the location of the fort made it possible for one ship of the attacking squadron (without being shelled) to make observations for the others, and yet it was noticed on this occasion that the attacking ships made use of the old tactics—to engage at very short ranges in order to offset the relatively bad marksmanship of ships against forts.

When regarded as an offensive method the artillery attack has passed through the development which is the consequence of the increased range of the guns. The attack is opened by a "recognition" fight to ascertain the range of the fort line and eventual dead angles; this fight must therefore be carried on within the limit of the active firing range and when moving. The most conspicuous frequently 10 to 15 kilometers, while before the war the maximum alteration was, as above mentioned, the increased range, which was

distance was reckoned 8 to 10 kilometers. It was also noteworthy that the engagements were often carried on while the ships were moving at high speed. Before the war the general idea was to have the ships fire when moving slowly, if they did not prefer to fire while lying at anchor.

During the World War, also, the monitor was employed in the battles against coast fortifications, especially in the case of the Dover patrol, which had several of them. It was previously supposed that the monitor would be particularly suited for attacking naval fortifications. Its heavy ordnance made it effective at the weak points of the sea fortifications, but it seems that the cherished anticipations have not been realized, as after the war the monitor has been excluded from all the navies with the exception of Italy. Judging from the knowledge that was acquired during the war concerning the energy with which the combatant parties procured the necessary means for the solution of certain problems, one ventures to prophecy that the monitor will again turn up in the theater of war if it can prove to be of real use in a given situation. Only once—on the coast of Flanders—was it possible to form an idea of what the monitor was capable of doing. Here the monitors certainly performed a good job, but still they did not succeed in striking effectively at the German fortifications along the coast. Perhaps this may be the reason for Admiral Bacon's statement—

> Never in history has a fortified coast base been taken by naval forces without the aid of the army.

Not only during the fights at the Dardanelles but also during the frequent encounters between the Dover patrol and the German coast batteries, it was observed how the ships feared to be shelled by the coast guns, and it is therefore most interesting to learn the conclusion of Admiral Bacon after a repulsed attack on the German coast forts—

> My opinions of the futility of men-of-war engaging in fights against heavy coast artillery (which had hitherto been theoretical only) were confirmed in a highly practical manner.

In spite of the increased effect of ship's guns, the battles of Sedd-ul-Bahr, Kum-Kale and the forts in the Narrows show that one of the theories existing before the war still holds good, i. e., that open earthworks can only be taken by direct battery fire against the individual guns.

CAPTURING BY ASSAULT

This was never done during the World War in any naval engagement. The aim of this action is to force an entry without regard

to the fire from the land batteries. The action at the Dardanelles was based upon this idea; but the enterprise never had this character. Actual conditions were such that the attacking fleet first had to engage the coast defenses before it could have forced an entrance to the Sea of Marmora.

Confident in the range of the modern long-range naval guns and the possibility of making observations from the air, the English naval authorities made the mistake of believing that it would be possible for the ships alone to force a passage through this channel where the coasts were bristling with forts lying so near each other that the guns fully covered the passage, in which there were also numerous mine blockades. It was forgotten, apparently, that one purpose of long range guns is to assist in obtaining observations, and that it is one question to fire at targets on the sea where the hits show very clearly, and another to fire at land targets, all the more so when observations can be made from the firing ship only.

Observers must of course note the exact location of the fall of shot, but this means that the attack must have assistance from the army. As we know, this point was acknowledged later on, but too late, and the attack was therefore never successful.

The decision of the Allies to undertake such an operation without preparations, and as an artillery attack, was a direct violation of all war experience, and it is therefore not astonishing that this attack was quite impracticable and will go down in history as an illustration of the fact that any disregard of war experiences must be dearly paid for.

As will be understood, a forcing by submarines is very dangerous to the defense and can hardly be prevented except by the use of special means of defense such as submarine nets, etc. During the World War this was applied on a small scale at the Dardanelles.

From the above remarks, it will appear that the future methods of attack against coast fortifications will take the following forms: (*a*) Bombardment, (*b*) artillery attack, and (*c*) assault. Even if the blockade as a form of offensive is discontinued, this will cause no change in the tactics of coast fortifications, inasmuch as none of the types of defensive weapons were destined for this particular purpose.

Practically, the reduction in the types of offensive action means that the coast fortifications (1) save the ammunition necessary to keep the blockade ships at a distance: (2) avoid the destruction of personnel and material which would result from an engagement.

The result might perhaps be a slight, although conclusive, increase of the power of resistance of the forts for the more important artillery action.

The modern coast fortification has certainly had its tasks reduced but at the same time it must be all the more on the alert against

other forms of attack. Modern methods of attack force the personnel of the fortifications to exert increased watchfulness and attention. It is therefore not too much to say that the requisites of fighting efficiency and perfect discipline, which have always been necessary in the successful defense of coast fortifications during an engagement with warships, have been greatly increased through this reduction in the methods of types of attack.

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OFFICE OF NAVAL INTELLIGENCE
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FOR CONVENIENCE IN ROUTING

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Executive Officer			
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Navigation Officer			
First Lieutenant			
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Asst. F. C. Officer			
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First Division Officer			
Second Division Officer			
Third Division Officer			
Fourth Division Officer			
Fifth Division Officer			
Sixth Division Officer			
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"V" Division Officer			
"A" Division Officer			
"B" Division Officer			
"E" Division Officer			
"M" Division Officer			
"N" Division Officer			
"R" Division Officer			
Radio Officer			

The material for the BULLETIN is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

NOTICE

The contents of this number of the BULLETIN are based upon information received in the Office of Naval Intelligence between September 23 and October 20, inclusive.

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CONFIDENTIAL

O. N. I. MONTHLY INFORMATION BULLETIN

VOL. IX NOVEMBER, 1926 No. 5

ARGENTINA

A. NAVAL

1. Fire on board battleship "Rivadavia."

On August 28 a small fire was discovered in the inflammable storeroom on board the *Rivadavia*. The press states that it was caused by the breaking of a sulphuric-acid container and that little, if any, damage was done.

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2. Deficiencies in guns of "Rivadavia."

The press of September 20, 1926, contain articles regarding deficiencies noted in the 12-inch guns of No. 2 turret on the Argentine battleship *Rivadavia*.

The paper states that in accordance with the program arranged by the naval general staff the *Rivadavia* left Puerto Belgrano to commence the annual target practice. It states further that this is the first time that the crew of this ship have employed the new fire-control system.

A commission to investigate the deficiencies in the 12-inch guns has arranged a series of experiments to determine the trouble which up to this time previous commissions have been unable to explain.

Some time ago it was reported that one of the guns in this turret was injured by frozen spray, which entered the gun during one of the trial trips in the United States in zero weather. The tompion in the gun had not been secured and the guns were discharged in the condition mentioned. Nothing is known regarding the truth of this statement.

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3. Argentine naval expenditure.

A bill, which has been approved by Parliament, authorizing the Government to spend 75,000,000 gold pesos in bringing the navy up to date, provides for three light cruisers, six destroyers, and six submarines. The cruisers will replace the obsolete vessels of that class. The destroyers will take the place of the eight which had been ordered from France and Germany, the contracts for which have been canceled. The bill also provides for the initial work on a navy

yard at Mar del Plata and the enlargements of the shipyards on the River Plate and at Puerta Belgrano.

The funds for this enterprise will be obtained through internal or external loans. The expenditure will be extended over a period of 10 years. No indication has been given as to where the various materials for the ships are to be purchased.

---

4. Visit to naval academy and arsenal in Rio Santiago.

The naval academy is situated on an island in the river and is reached from Buenos Aires by the Southern Railway to La Plata, where it is necessary to change trains, and on arrival at Rio Santiago it is further necessary to proceed by launch to the school.

My guide conducted me to the office of the commandant of the navy yard, whom I had previously met when he was in charge of the aviation field at Puerto Belgrano, and my guide then conducted me through the various workshops of the navy yard, which is also at Rio Santiago.

The workshops of the navy yard, which is not particularly extensive, were housed in what we would consider temporary buildings, and were not of large capacity nor was the machinery very modern. I was informed that the largest casting they had been able to make was of bronze, of about 225 pounds in weight. The brass smelting furnace was small, and the quarterman in charge of the foundry had improvised a very clever scheme for melting brass with fuel oil. It was explained that the reason for making this change with shop labor and available material was the lack of money for putting in a modern furnace.

The machine shops and boiler shops were busily occupied in the overhaul of the machinery of the torpedo boat destroyer *Catamarca*, whose turbine rotors I saw on the shop floor apparently in excellent condition. The boiler makers were engaged in overhauling the boilers and changing them for use of fuel oil. Among other things, I noted the main steam lines which were of extremely rugged construction. Instead of gaskets being used, steel rings of a diamond-shaped section were fitted between sections of piping, making bayonet joints. Work outside was being carried on upon the hull of the *Catamarca*, which was in close proximity to the shop. This general overhaul was the only important work under way in the arsenal, which employs more than 500 men.

The superintendent informed me that the labor was excellent, the supply good, and the men all very much interested in their work. There were few Argentinians employed, most of the machinists being of foreign extraction. The superintendent further informed me that he was particularly pleased with his workmen as they were

of a much higher type than those employed in the arsenal in Buenos Aires, where the work was not so satisfactorily carried out.

Upon leaving the workshops, my guide took me on board the torpedo boat destroyer *Jujuy* which was preparing to leave harbor in the afternoon. The *Jujuy* has not yet been converted to an oil burner. The *Jujuy* looked neat and clean, but lacked the touch that would put her down as excellent upon inspection. I noted on the *Jujuy* that the officers' quarters were aft, and that the captain had a special cabin and stateroom with private bath of moderate size containing a small bathtub. The commanding officer's stateroom was slightly larger than it is on our late destroyers.

Lunch was provided by the acting superintendent in the suite provided for the superintendent of the naval academy, after which, about 2.30, the inspection of the academy commenced, and I visited the dormitories, messroom, several study rooms, practical workshops, library, kitchens, bakeries, and one recreation room, which is the only one available and which is used by the first class only.

The points I noted particularly were that three large dormitories each capable of holding a hundred midshipmen were provided. The midshipmen sleep in standee bunks two in each section. No curtains of any kind are provided, nor are the beds separated by screens. In this room, which is cared for by specially employed servants who sweep and polish the floors, make the beds, and change the linen, were provided small wardrobes containing long mirrors, with space enough for a group of midshipmen to keep their best uniforms, overcoats, and one pair of shoes. On the outside a circular tin box was provided in which the midshipman stores his hats. Opening from each dormitory was a large, well-lighted bathroom containing about 50 showers, none of which were inclosed, thereby depriving the midshipmen of any privacy that was to be expected under the circumstances. The dormitories were very cold, and, although piping was installed, radiators had been removed because the midshipmen "caught cold in the overheated room."

The mess hall was not as clean or well ventilated as it might have been. I was informed that the midshipmen have their meals under the supervision of one of the midshipmen officers and no commissioned naval officers are present at any time. Discipline is maintained by the senior midshipmen. In leaving the mess hall I passed the kitchens and had the opportunity of glancing at them, but my impression was that they were not particularly well kept.

About 100 midshipmen were undergoing physical exercise in the courtyard, which is provided with a roof for rainy weather. The men had no special gymnastic uniform, having removed their coats and collars. I noted the shirts worn were in the majority of cases

blue, but in other cases gray, pink, and white, leading me to believe that great latitude is permitted in the uniform other than coat and trousers. The drill seemed well conducted, but here and there midshipmen were evidently avoiding the exercises when the instructor's face was turned.

The workshops used by the midshipmen for practical work were in operation, and I observed the character of the test work of the midshipmen. The machine work is quite similar to that carried out at the United States Naval Academy, but it seemed to me that it was much more extensive. As a matter of fact, in several cases I observed the midshipmen who were under instruction for the engineering corps. Examples of work were on exhibition. Each piece of work carried the number of the midshipmen who had completed it, and, in my opinion, all were in the very good to excellent class. In all cases of work of this character, each piece of work carried an identity card in addition to the number of the midshipmen. This card contained the grading of the article in question and the number of hours the midshipmen had taken to complete it. The entire academy is on a very small scale, and I was informed that lack of money prevented the development of the academy as much as the navy desired.

Before leaving the building I visited the small museum, as it might be called, which contained a model of the turbines and reduction gear as installed on the *Rivadavia* and *Moreno*. The case may be lifted and the turbines and gearing turned by the operation of a small crank. This model was purchased from Boucher & Co., New York, for $4,000. This museum also contained a very small operating model of one of the turrets of the *Moreno*, which was made by the Fore River Shipbuilding Co. The technical library opens off the "museum" and contains most of the important books written on the Great War, all of which are in English. The superintendent's office library contains a copy of every book used at our Naval Academy at Annapolis.

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5. Visits of foreign men-of-war to Argentina.

Since the first of the year men-of-war from Brazil and Uruguay have visited this country on official missions, and on August 31, 1926, the British light cruiser *Colombo* will arrive. This will be the third British man-of-war to arrive in Argentina within one year. The other vessels were H. M. S. *Repulse* and H. M. S. *Curlew* (the sister ship of the *Colombo*).

While on an official visit to Montevideo, Uruguay, I was informed by one of the officers of the *Colombo* that the presence of that vessel

in Montevideo for the Uruguayan independence day, 25th of August, 1926, was due to special orders, as she was sent from Gibraltar by way of Rio de Janeiro.

The presence of another English war vessel in Argentina would seem to be significant at this time, in view of the fact that there is an Argentine naval mission in England, certain members of which have been designated to purchase new units for the Argentine Navy.

I have been frequently asked if I knew whether or not any naval vessels from the United States would visit Argentina in the near future. Not so long ago the Argentine Minister of Marine asked a similar question, and said how thoroughly he enjoyed seeing the *Richmond* when she was here almost three years ago.

There is no doubt that the presence of H. M. S. *Colombo* is for propaganda purposes, and is in furtherance of an English commercial campaign that for the past year has been growing stronger and stronger.

B. AERONAUTICAL

1. Disposition of the "Plus Ultra."

The *Plus Ultra*, the Dornier Wall plane in which Commander Franco flew from Spain to Buenos Aires, and which Spain donated to the Argentine Government, has been incorporated in the naval aviation service.

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2. Proposed dirigible flight from Spain to Argentina.

For some time past the press has been giving a great deal of publicity to a proposed flight of a dirigible from Seville, Spain, to Buenos Aires, Argentina. Mention has been made of the possibility of building hangars in Spain and the providing of necessary arrangements for handling the dirigible in Argentina.

It is now proposed that this flight be attempted in 1929 with Zeppelins built at Friedrichshafen Works, under a subsidy supplied by the Spanish Government of 30,000,000 pesetas, including a contract for a five-year period.

The airship, known as *LZ–127*, of 135,000 cubic meters' capacity, able to lift 15 tons of cargo, will have a radius of action of 6,250 miles, and it is expected to cover the distance between Seville and Buenos Aires in four and a half days.

BRAZIL

A. NAVAL

1. Sale of Brazilian cruisers.

In the edition of September 5 the Diario Official reports that the accounts committee of the Chamber of Deputies, after a careful examination of all the documents submitted, has recommended the approval of the bill (quoted below) concerning the sale by the Ministry of Marine to the Mexican Government of the ex-cruiser *Deodoro* for 8,000 contos, of which 1,500 contos were to be paid down and the balance in eight equal monthly installments. With the proceeds of the sale the Government bought from the *Sociedade Anonyma Ansaldo San Giorgio*, of Genoa, Italy, a submarine which is to be delivered by March, 1927. The bill reads as follows:

ART. 1. All acts of the Ministry of Marine concerning the sale to the Mexican Government of the ex-cruiser *Deodoro* are hereby approved.

A representative of the Electric Boat Co. informs me that during a recent conversation with an official of the Ministry of Marine he was told that the Brazilian Government had endeavored to sell not long ago the ex-cruiser *Floriano* to the Mexican Government for 6,000 contos, but that as the boat had proved to be unseaworthy in trials it had been impossible to interest Mexico.

The sentiment in the Ministry of Marine and in the press is toward an increase in the Brazilian Navy. Last year it was suggested that the individual State governments subscribe toward a new Brazilian battleship. The State of Minas Geraes offered to give 10,000 contos (about $1,500,000), but it is not known whether any of the other States also contributed. Unless money is obtained by the sale of old ships or popular subscription it is doubtful whether the Federal Government, bent as it is upon maintaining a policy of economy, will sanction expenditures for any large additions.

NOTE.—The *Deodoro* and *Floriano* are sister ships and more resemble coast-defense battleships than cruisers. They were built in 1899, mount two 9.4 and four 4.7 inch guns; speed, 15 knots; and have a heavy armor protection, with a displacement of 3,150 tons.—Ed.

CHILE

A. NAVAL

1. Proposed increase of armaments.

[Source: Chilean press]

In spite of the secrecy guarded by official circles, news has reached us that the Chamber of Deputies is studying, already favorably recommended by the Senate, an important project of the executive power concerning the acquisition of naval armaments.

The plan includes the acquisition of 12 destroyers of 1,800 to 2,000 tons; 6 destroyers of 1,000 tons displacement, 2 cruisers of 3,000 to 4,000 tons, and 2 transports. For all these units there will be appropriated about £3,400,000 sterling.

In the message accompanying the project the executive power urges the sanction of the plan, to which may be attributed some relation with the northern problem.

NOTE.—The naval strength of Chile was outlined in the September BULLETIN. There is apparently widespread agitation in Chile for an increase of naval strength, due, probably, to the Tacna-Arica dispute between Chile and Peru, and also because the latter country has just built two submarines in the United States. For other aspects of the Chilean-Peru dispute, see "Peru" in this BULLETIN.—Ed.

CHINA

A. MISCELLANEOUS

1. Activities of Soviet agents.

Since the defeat of the Kouminchun the Bolsheviks in Peking have not only become very wary but have greatly curtailed their activities. The immediate cause of this has probably been the instructions issued by the Soviet Ambassador Karakahn. Peking Bolshevik agents have been sent by Karakahn lately to Canton to endeavor to persuade the Canton forces to cooperate with the Kouminchun.

The secret meeting of the Bolsheviks recently scheduled to be held in Peking had to be canceled as a majority of the members were afraid to attend. On the instructions from Karakahn, the director of Bolshevik work in Peking had the following announcement posted in the various schools of Peking on August 25:

GENTLEMEN: Owing to the oppression of the militarists and in view of the failure of the Kouminchun in the northwest, the work of our society must be suspended for the time being. As soon as the schools open for the

next semester and more of our fellow members return to Peking, another special meeting of the society will be called for and you will be requested to help assist in bringing about happiness to the people then.

It is reported that during July the total expenditure in China by the Russian Bolshevik agencies for propaganda, military expeditions, bribes, salaries, etc., amounted to over $20,000,000. It is further rumored that the authorities in Moscow objected to this excessive expenditure on the part of their representatives in China and demanded an explanation from the Soviet ambassador.

Karakahn is known to favor an aggressive Bolshevik policy against China, which policy is approved by the radical wing of the Communist Party. However, the Soviet foreign office has apparently not yet decided as to its future policy in China. It is rumored that Karakahn believes that the Soviet Government has lost many valuable opportunities in China due to its indecision, incompetency, and waste of time. Karakahn believes that Bolshevik propaganda in China should now be of a predominantly nationalistic nature rather than a true communist one, which he believes will come later on.

It is reported that the Japanese are well informed in regard to Russian Bolshevik activities in Manchuria and Mongolia and also that they have obtained copies of certain compromising Bolshevik documents that they threaten to publish if the Soviet activities continue to hinder Japanese interests.

The educational institutions of Peking will soon open for the next school year, and there are many students back to the capital from their homes in the various Provinces. A circular announcement has been made and distributed among the various colleges of the city which in turn made separate notes to the Bolshevik students in their compounds. The following are copies of the announcements and notifications mentioned above:

ANNOUNCEMENT MADE BY THE BOLSHEVIK HEADQUARTERS OF PEKING

Since the last announcement issued by this office, the students of the various schools have gradually returned to Peking, and it is time for us to proceed with the work of our society. We have, since the fall of Nankow, been laboring under heavy oppression of the militarists, but under the circumstances, we must be patient. We are glad to be in receipt of a telegram from Mr. Chang Shu-nan, of Shanghai, stating that Yochow has really been captured by our soldiers, who are now advancing on Wuchang and Hankow. They are very well equipped with money and munitions. One million dollars have just reached the front from Russia for distribution among the southern troops, and that accounts for their success at Yochow. It is requested that you will report from time to time the arrival of members of our society in your school and will help in the development of the interest of the society. (Seal of the headquarters of the Peking Bolshevik Society, August 28, 1926.)

ANNOUNCEMENT MADE BY THE CHAOYANG UNIVERSITY BRANCH OF THE BOLSHEVIK SOCIETY OF PEKING

By instructions of the headquarters of this society, it is requested that all members of the Bolshevik Society of this university will report of their arrival at this office at an early date and help to improve the work of this branch of the society. It will be appreciated if each of our old members will try to introduce three new members to us, and such work will be duly rewarded by the headquarters of the society. (Bolshevik Society of the Chaoyang University, August 29, 1926.)

There appeared in the bulletins of the government law college yesterday an announcement which reads as follows:

We have been teaching without pay for about one year in Peking. We are not officials. The officials can squeeze the people's money, but we can only chew book leaves, which can not satisfy hunger, but would hurt our stomachs. Gentlemen! Can't we find other jobs elsewhere? The present educational authorities are nothing but night-soil manufacturers. The poor students come to Peking from thousands of miles away for education, but they can not get what they want. What can we do for them? Now that we teachers, or rather book eaters, are leaving the students, our farewell present to the students is an advice for them to go immediately to the "Red" world. Go, you youngsters! Don't miss the opportunity that is ahead of you.

CUBA

A. NAVAL

1. New cruiser.

It is reported from Cuba that the Cuban Navy is to build a new cruiser of 4,500 tons, the construction of which will probably be contracted for in the United States—possibly in Philadelphia.

ECUADOR

A. MILITARY

1. Italian military mission to Ecuador.

[Source: M. I. D.]

In a general way this mission has not been successful. When one reflects on the difficulties which the Swiss mission in Colombia is at present experiencing and the shaky reputation which the French left behind them in Venezuela, then the work of this particular mission becomes of immediate interest as a model solution of the problems incident to contact with a typical Latin-American Government.

The task of a military mission in a Latin-American setting is not simple. Without entering into details of relations with the general Government, i. e., the appropriations of funds, etc. (after all a vital element, as without money and material nothing tangible may be accomplished), a mission composed of officers accustomed to a high professional standard will face the following adverse elements, within the Army they expect to train: (a) A native officer personnel, which has little culture or academic training and is generally drawn from an inferior social level; (b) an older hierarchy who are shot through with political affiliations, poorly trained but jealous of every prerogative of rank and psychologically adverse to the foreign officers, whose professional superiority they realize but do not readily admit, as they fear for their own prestige; (c) a poor conception of professional responsibilities; (d) inferior equipment, generally inferior or obsolete training, etc. The Swiss mission has been confronted with every one of these obstacles and failed to master them: the Italians have had to face the same problems, more or less, and have, apparently, succeeded.

In close personal contact with the members of the Italian mission, I am impressed by certain qualities and a consistent method. In the first place the personnel of the mission has been carefully selected; every one of the officers has a distinguished war record. (The psychological influence of this factor is important; the Swiss could not score at that point.) Besides their very obvious, professional qualities, these officers are very cultured; nearly all hold academic degrees in law, the arts, or science.

In relative importance the work of the chief of the mission, Gen. Pirizio Biroli, is outstanding, and I attribute the smooth operation of the mission principally to the influence of his personality. An officer of distinguished personal appearance, shrewd judgment, and an immense amount of tact, the general has been a perfect liaison, a buffer, a coordinator, an executive.

He is the social representative of the mission, toward the capital and society, as well as its professional controller. He is immensely popular with Ecuadorians as well as with his own subordinates. I attribute this to the perfect tact and a shrewd evaluation of Latin-American psychology. He has told me that, in the beginning, he was discouraged at the seemingly endless task ahead of the mission, the irritations, the disappointments; he had to curb the efficiency of his own officers, to modify every professional standard in order to fit the backward conditions which he encountered; like the Swiss he had to meet "silent resistance," etc. However, he had the faculty of compromise and patience.

The programs of instructions were adjusted to the intellectual and social level of the Ecuadorian officers; once in motion, improvements were introduced from year to year, and standards of performance raised.

The mission was compelled to bring from Italy practically every item of equipment or armament required in the course of their training activities; technical equipment such as signal communications and modern armament, machine guns, mountain artillery, etc., were eventually furnished by the Italians.

The mission established promptly a series of special courses, for each service, viz:

(*a*) Intensive courses for artillery, infantry, cavalry, and engineers.

(*b*) Course in military sanitation.

(*c*) Practical course for farriers and horseshoers.

In 1924 and 1925 the War College was opened, to which the Italians are giving special attention. Other courses were instituted, with a broader and more exacting program than the initial courses, viz:

Special engineering course (2 years).

Special artillery course (1 year).

School of radio-telegraphy (1 year).

Special infantry school (8 months).

The War College course (2 years).

A characteristic of the mission is the fact that instruction is concentrated upon officers, in officers' schools; direct contact with troops, i. e., immediate troop training is, as a rule avoided; there are, of course, instances of direct troop training. The director of the artillery course, Maj. Cav. Giovanni Fava, for instance, employs the Artillery Regiment "Sucre" as a school unit. It may be said, therefore, that the mission concentrates on the training of officers through the agency of a series of special courses for each branch.

This differs from the method of the Swiss, to attach their officers to units and attempt direct command; in the latter case, it has led to insuperable friction.

The sequence of instruction of the mission was evidently dictated by local needs as found upon their arrival. The first year was occupied with a rather irregular program of many brief specialist courses; they filled gaps as they encountered them; from the second year on they found their bearing, or rather the limitations of local situation, and conformed their programs thereto. The graduates of the first courses, apparently satisfied with their instruction, became supporters of the Italians as they joined their units; but there was still a veiled antagonism on the part of the older layer

of officers who were brought up by the Cbrera Mission and its formal German methods.

A curious point to note is that the military coup d' etat of July 9, favored the Italians indirectly; this movement swept the older officers from control and gave access to the younger and more progressive element in the officers' corps.

Since 1926 the flow of students has been systematic and there are definite objectives; the War College and the engineering course have well developed programs and rigid standards of performance; the artillery course is also well defined. The early cavalry course appears to have had excellent results. I consider the cavalry unit "Yaguachi" efficient for field service: horsemanship is excellent, and I have seen them operate skillfully over most difficult terrain.

Progress in infantry is not so apparent; an intensive course in machine-gun training has had some effect. The Italian instructor is at present engaged in developing drill regulations and the modern formations, incident to the World War.

The influence of the instructor is, of course, most effective in the Military Academy.

As a general evaluation the Italian Mission has rendered unquestionable service: they are hampered by lack of funds. Unlike the Swiss in Colombia, they have abstained from meddling with political questions or attempt to influence military legislation unduly; they have a frank realization of what can be done and what is impossible, within the framework of Ecuadorian conditions: their reforms, no doubt, would have gone further had they believed that there was a chance to carry them through. I think this quality of wise restraint and intelligent compromise is a most important element in the conduct of military mission and is the secret of their relative success.

FRANCE

A. NAVAL

1. Shipbuilding program.

A table showing the percentage of completion of all ships of the French shipbuilding program, as of September 1, 1926, is given herein.

FIRST PROGRAM—(LAW OF APR. 18, 1922)

Type of ship and name	Place of construction	Date of launching, actual or proposed. (Actual dates are itâlic)	Date of official trials		Percentage of completion
			Date originally set	Date actually held or later proposed	
3 cruisers of 8,000 tons:					
Duguay-Trouin	Brest	*Aug. 14, 1925*	April, 1925	Undergoing trials.	
Primauguet	do	*May 21, 1924*	do	do	
Lamotte-Picquet	Lorient	*Mar. 21, 1924*	do	do	
6 destroyers of 2,400 tons:					
Jaguar	do	*Nov. 7. 1923*	do	In service	
Panthere	do	*Oct. 27, 1924*	do	do	
Leopard	Loire (St. Nazaire)	*Sept. 29, 1924*	Jan. 31, 1925	do	
Lynx	do	*Feb. 24, 1924*	Apr. 30, 1925	November, 1926	98
Chacal	Penhoët (St. Nazaire).	*Sept. 27, 1924*	Apr. 25, 1925	In service	
Tigre	Bretagne (Nantes)	*Aug. 2, 1924*	Feb. 10, 1925	do	
12 destroyers of 1,460 tons:					
Bourrasque	de France (Dunkerque)	*Aug. 5, 1925*	Mar. 15, 1925	Undergoing trials.	
Cyclone	Méditerranée (Le Havre).	*Jan. 24, 1925*	Jan. 31, 1925	do	
Mistral	do	*June 6, 1925*	Mar. 31, 1925	November, 1926	85
Orage	Navals Fr. (Blainville).	*Aug. 30, 1924*	Jan. 1, 1925	Undergoing trials.	
Ouragan	do	*Dec. 6, 1924*	Mar. 1, 1925	do	
Simoun	Penhoët (St. Nazaire).	*June 3, 1924*	Jan. 10, 1925	do	
Siroco	do	*Oct. 3, 1925*	Mar. 10, 1925	do	
Tempete	Dubigeon (Nantes)	*Feb. 21, 1925*	Mar. 31, 1925	do	
Tornade	Dyle et Bacalan (Bordeaux).	*Mar. 12, 1925*	do	October, 1926	92
Tramontane	Gironde Bordeaux	*Dec. 1, 1924*	Jan. 15, 1925	Undergoing trials.	
Trombe	Gironde (Harfleur)	*Dec. 27, 1924*	Mar. 1, 1925	September, 1926	95
Typhon	Gironde (Bordeaux)	*May 22, 1925*	Apr. 15, 1925	December, 1926	86
6 submarines of 1,150 tons:					
Requin		*July 19, 1924*		In service	
Souffleur	Cherbourg	*Oct. 1, 1924*		do	
Morse		*Nov. 18, 1925*	Apr. 15, 1925	Undergoing trials.	
Narval		*May 9, 1925*		In service	
Marsouin	Brest	*Dec. 27, 1924*		do	
Dauphin	Toulon	*Apr. 24, 1925*		Undergoing trials.	
6 submarines of 600 tons:					
Ondine	Normand(Le Havre)	*May 8, 1925*	May 8, 1925	December, 1926	88
Ariane	do	*Aug. 6, 1925*	July 8, 1925	February, 1927	86
Sirene	Loire (Nantes)	do	May 8, 1925	Undergoing trials.	
Naide	do	*Oct. 20, 1925*	July 8, 1925	do	
Circe	Schneider Chalon-sur-Saône.	*Oct. 29, 1925*	May 8, 1925	October, 1926	90
Calypso	do	*Jan. 28, 1926*	July 8, 1925	December, 1926	86
Aircraft carriers:					
Bearn	Méditerranée	*Apr. 15, 1920*	Aug. 4, 1925	do	86
Coast defense submarines (Finance law of June 30, 1923)					
3 submarines of 1,130 tons:					
Caiman	Cherbourg	January, 1927	April, 1926	April, 1927	75
Phoque	Brest	*Mar. 16, 1926*		Undergoing trials.	
Espadon	Toulon	*May 27, 1926*			
6 submarines of 600 tons:					
Eurydice	Normand (Le Havre).	December, 1926	Oct. 8, 1925	May, 1927	70
Danae	do	February, 1927	Dec. 8, 1925	July, 1927	68
Galatee	Loire (Nantes)	*Dec. 18, 1925*	Oct. 8, 1925	Undergoing trials.	68
Nymphe	do	*Apr. 1, 1926*	Dec. 8, 1925	September, 1926	91
Thetis	Schneider (Bordeaux).	September, 1926	Oct. 8, 1925	January, 1927	76
Doris	do	November, 1926	Dec. 8, 1925	March, 1927	74

SECOND PROGRAM (FIRST PART)—(LAW OF APRIL 12, 1924)

Type of ship and name	Place of construction	Date of launching, actual or proposed. (Actual dates are italic)	Date of official trials		Percentage of completion
			Date originally set	Date actually held or later proposed	
2 cruisers of 10,000 tons:					
Duquesne	Brest	*Dec. 17, 1925*	Apr. 1, 1927	August, 1927	60
Tourville	Lorient	*Aug. 24, 1926*	do	October, 1927	47
2 submarines of 1,560 tons:					
Redoubtable	Cherbourg		Apr. 12, 1927	do	47
Vengeur	do		do	December, 1927	42
6 destroyers of 1,495 tons:					
L'Adroit	de France (Dunkerque).		Sept. 25, 1926	January, 1927	47
l'Alcyon	Gironde (Bordeaux)	*June 26, 1926*	July 25, 1926	November, 1927	39
Le Mars	Navals Fr. (Blainville).	*Aug. 28, 1926*	Aug. 21, 1926	April, 1927	42
Le Fortune	do	November, 1926	Nov. 21, 1926	July, 1927	37
La Palme	Dubigeon (Nantes)	*June 30, 1926*	Aug. 21, 1926	March, 1927	46
La Railleuse	do	September, 1926	Nov. 21, 1926	April, 1927	41
Oil tankers (Law of Aug. 5, 1924)					
1 tanker of 6,000 tons oil capacity:					
Loing	Worms (Le Trait)		Apr. 25, 1926	December, 1926	70

SECOND PROGRAM (SECOND PART)—(LAW OF JULY 13, 1925)

1 cruiser of 10,000 tons:					
Suffren	Brest	May, 1927	Aug. 1, 1928		
4 submarines of 1,560 tons:					
Pascal	do		Apr. 15, 1928		
Pasteur	do		July 15, 1928		
Henri Poincare	Lorient		June 15, 1928		
Poncelet	do		Sept. 15, 1928		
3 destroyers of 2,690 tons:					
Guepard	do		July 1, 1928		
Bison	do		Sept. 1, 1928		
Lion	de France (Dunkerque).		Aug. 1, 1928		
2 submarine mine layers of 760 tons:					
Saphir	Toulon		July 13, 1928		
Turquoise	do		do		
4 destroyers of 1,495 tons:					
Brestois	Dubigeon		Oct. 10, 1927		
Boulonnais	Navals Fr		Oct. 1, 1927		
Basque	Worms		Jan. 1, 1928		
Bordelais	Gironde (Bordeaux)		Nov. 21, 1927		
3 submarines of 1,560 tons:					
Archimede	Navals Fr				
Fresnal					
Monge					
1 surface mine layer of 5,300 tons:					
Pluton	Lorient		March, 1930		
1 aircraft carrier of 10,000 tons:					
Commandant Teste.					

SECOND PROGRAM (SECOND PART)—Continued

Type of ship and name	Place of construction	Date of launching, actual or proposed. (Actual dates are italic)	Date of official trials		Percentage of completion
			Date originally set	Date actually held	
Coast defense submarines and river gunboats					
(Financial law of Apr. 29, 1926)					
4 coast defense submarines of 630 tons:					
Diane					
Meduse					
Argonaute					
Arethuse					
1 Yangtse River gunboat of 720 tons:					
Francis Garnier	Navals Françias		Dec. 11, 1927		

SECOND PROGRAM (THIRD PART)—LAW OF AUG. 4, 1926)

1 cruiser of 10,000 tons:	Brest				
3 destroyers of 2,690 tons.					
4 destroyers of 1,495 tons.					
1 submarine cruiser of 3,250 tons.	Brest				
5 first-class submarines of 1,550 tons.	Brest				
1 submarine mine layer of 760 tons.	Toulon				
1 submarine depot ship					
2 tankers of 8,600 tons capacity.					
1 school ship					

2. *Shipbuilding notes.*

[Source: English press]

Lorient arsenal, which is the chief State shipbuilding center, has just received orders to lay down the 2,700-ton destroyers *Bison* and *Guépard*, of 70,000 horsepower and 37 knots, and to commence the 1,560-ton and 92-meter long submarines *Poincaré* and *Poncelet*, together with the 5,560-ton mining cruiser *Pluton*. Cherbourg is preparing the laying down of a 3,000-ton submarine cruiser, and Brest that of a 10,000-ton cruiser and of two submarines.

NOTE.—See the attached building program sheet. The vessels mentioned above belong to the second and third parts of the second program.—Ed.

3. *Motor boat for Soviet Government.*

There is being built on the Seine, under private contract, a patrol boat similar to the Italian *M. A. S.* type, for the Soviet Government. This craft will have a displacement of 37 tons, will develop 4,000 horsepower, and a speed of 52 knots. In the stern, a light torpedo tube can be placed.

4. Foreign cruises.

It is the intention of the Minister of Marine to form the new 8,000-ton light cruisers into a flying squadron and proceed on a number of foreign cruises.

The idea is conveyed that such a cruise is impatiently awaited by French diplomatic representatives and French citizens abroad. Comment is freely made on the advantage of the new light cruisers presenting the flag abroad, over the old cruisers *Jules-Michlet* and *Victor Hugo*, which made the foreign cruise in 1922 under command of Rear Admiral Gilly.

In drawing a contrast between the new light cruisers and the old *Victor Hugo* class, the *Duguay-Trouin* type of cruiser is considered by the French to be the genius of naval construction, both as regards speed and armament. The French press resents any inference that the new Italian light cruisers are superior in the slightest degree.

The proposed foreign cruise is especially welcome to those far-sighted citizens who have the interests of the Navy and French colonies at heart. The actual experience and training to be gained under actual service conditions is considered well worth the expense involved.

The press remarks that the Minister of Marine is now to be congratulated, where heretofore he generally received severe criticism, for organizing the proposed cruises of various new units, as well as the present summer cruise in the Baltic of several of the new units of the fleet. Mention is made of the enthusiastic reception of the officers and men of the Baltic units by the populace of the various ports visited, as well as the keen interest taken in the new ships.

A cruise to the Mediterranean ports is contemplated for October. Several of the new ships—destroyer leaders, torpedo boats, and submarines—will form part of this squadron. The squadron will start from Bizerte and take in all French possessions in the Mediterranean and Levant, as well as calling at a number of foreign countries en route. The destroyer leader *Jaguar* (flagship) will have a band on board to render national honors as well as for entertainment purposes.

The following excerpt, taken from Le Matin, in connection with the proposed foreign cruise, shows to what extent this paper is giving a helping hand in the propaganda intensely carried on by the "Ligue Maritime et Colonial," with a view to preventing any possible reduction in the present navy building program:

Something, then, has come over the Navy Department? The suppression of idle and useless services have, then, really commenced: we have been

hearing of such a procedure for over 50 years; the skeptics gave up all hope of it ever being realized—they will now be forced to admit they were misled! Here we are with movement on every side; ships going far from their bases, intensive training of personnel, foreign cruises for new units. Truly, such an outcome is not displeasing to Frenchmen who adore the navy, but above all a navy that knows how to navigate.

B. AERONAUTICAL

1. Aircraft signaling.

The French Navy employs two methods for visual communications between planes, and between planes and ships. These methods are the following:

Flags are used for day signaling between planes and, at a little distance, for communication between planes and ships.

Projectors are used in all circumstances.

With these methods, communications may be considered as reliable up to distances of from 10 to 15 kilometers (6 to 9 miles), according to the weather.

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2. Visit to the Farman aviation factory.

A visit has been paid to the Farman aviation factory in order to see their recent progress.

The factory is only fairly busy at the present time, there being about 1,800 employees in the airplane and engine departments. It was noticed that many machine tools were idle.

The company is at present dividing its energies between all-wood and all-metal airplanes, but it frankly prefers the former category.

The all-metal machines consist of 150 Bréguet 19 A–2 and B–2 airplanes on order by the French Army. Of these, about 100 have been delivered. Most, if not all, of the Bréguet airplanes included in this order are fitted with the 500-horsepower Farman 12-cylinder W-type engine, which, it will be remembered, holds the world's duration record (45 hours 12 minutes), mounted on a Farman airplane.

NOTE.—This plane is built as a two-seater fighter, a two-seater reconnaissance machine, or as a bomber.—Ed.

The Bréguet airplanes manufactured at the Farman plants are practically identical with those built at the Bréguet factory, but the assembly arrangements are not as well organized, and it is understood that the Farman Co. is losing a considerable amount of money on the order.

The Farman Co. is also still building the Goliath two-engine bombing biplane in large quantities for the French Army and Navy. All the Goliaths now under construction are fitted with the Gnome-Rhone Jupiter engine. This is a vast improvement over the former

power plant consisting of two 260-horsepower Salmson engines, as the French Jupiter engine develops about 450 horsepower.

It will be remembered that in the war with the Riffs the only successful heavy bombing airplanes were Farman Jupiter-Goliaths lent to the army by the Ministry of Marine. The new Goliaths carry eight bombs totaling about 1,200 kilograms, and yet have a very satisfactory performance.

In addition to the French Government orders for Goliaths an order of 30 of these airplanes is being completed for Poland.

In a special workshop I saw in process of assembly four F–170 airplanes. This is part of the order of 15 for the Farman air lines (Société Générale de Transport Aérien).

The F–170 is used on the Paris-Berlin and the Paris-Amsterdam routes (the latter connecting with the Amsterdam-Malmö route exploited by the Swedish Air Line (A. B. Aero Transport).

The F–170 is very similar in outline to the well-known Jabiru but instead of having three or four engines, it is fitted with one 500 horsepower Farman engine in the nose.

NOTE.—This machine carries a useful load of 1,400 kilograms with a maximum ground speed of 220 kilometers per hour.—Ed.

A curious point is the location of the radiators projecting from recesses in the sides of the fuselage behind the passenger cabin. The only reasons advanced for this location is that in cold weather the cabin can readily be heated by a connection to one of the pipes between radiators and engine.

The cabin has seats for eight passengers, including two rather uncomfortable tip-up seats and two seats facing backward.

The three exhaust pipes are continued aft over the wing and pierced with slots on the sides, a form of silencer copied from that developed at Farnborough.

In the engine department I was shown the well-known 12-cylinder 500 and 18-cylinder 800 horsepower engines. It was noticed that the crank cases are of alpax and not aluminum.

The rights for the very ingenious reduction gear have been acquired for America by the Wright Co. This reduction gear has the advantage of permitting the axes of the propeller and of the crank shaft to be on the same level, thereby causing no stresses such as those imposed with the ordinary reduction gear in which the propeller axis is well above that of the crank shaft.

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3. Visit to the Bréguet factory.

A visit has been paid to the Bréguet aircraft and engine factory at Velizy, adjoining the aviation field of Villacoublay.

The Bréguet Co. is in full production on the type 19 observation and bombing airplanes. In December, 1925, the workmen numbered about 1,000 and the output was 20 airplanes per month. At the present time there are 2,500 workmen and the monthly output consists of 75 complete airplanes and spare parts for 25 airplanes.

In order to obtain this vast production, everything is systematized as much as possible. Indeed, the methods in use are founded on those used in large American automobile factories, the progressive assembly system having been adopted. It is only by these methods that the cost of the Bréguet 19 airplanes can be made so very low—that is, 100,000 francs ($3,000), complete without engine. Of course, the cost of labor is comparatively low, the workmen receiving from 5 to 8 francs (15 to 24 cents) an hour.

A number of special devices have been developed by the Bréguet factory to assist production, and a very elaborate system of jigs is used.

I noticed that the riveting of the main spars was done by a compressed-air machine running on a track and having two punches about 10 rivets apart. The first punch makes the hole for the rivet, after which the rivet is placed in the hole by hand and pressed home by the second punch.

The progressive assembly system of the fuselage has been adopted. At the very beginning the fuselage consists of merely the main longerons and struts. It is immediately equipped with the landing gear and a trolley is put under the stern of the fuselage. The fuselage is then moved forward and receives at various stages the engine, tanks, seats, duralumin formers, etc. Later the tail surfaces are attached and the wings dropped into place. The rigging is checked by two bars standing up from the floor, care being taken to have the landing-gear tires at a constant pressure. The rigging is, of course, facilitated by the existence of only one interplane strut on each side of the fuselage.

The Bréguet 19 is built with various engines, including the Lorraine Dietrich 400 and 450 horsepower, the Renault 480 horsepower, the Gnome-Rhone Jupiter, the Farman 500 horsepower, and the Hispano-Suiza 450 horsepower types.

In a special experimental shop I was shown an airplane being constructed for the forthcoming attempt by Captain Lemaitre to make a nonstop flight to India. This airplane has a special 550 horsepower supercompressed Renault engine, which in general design resembles the 480-horsepower type, but with cylinders having a longer stroke.

For starting purposes with a heavy load, in which full power is required, the engine has to take pure benzol, which is carried in two tanks incorporated in fairings in the sides of the fuselage. These

tanks hold a total of about 700 liters. The gasoline used for normal flying is contained in two tanks in the fuselage, holding about 2,300 liters. This gives a total fuel capacity of about 3,000 liters.

A similar airplane, but with an engine of somewhat less horsepower, is being built for a long-distance flight by Captain Vuillemin. The Bréguet Co. is also completing a Leviathan airplane for the forthcoming transport airplane competition. This airplane is an improved edition of the *Leviathan XXII* and will have two Bréguet-Bugatti 16-cylinder engines.

The designs have been completed for the *XXV C-2* two-seater fighter. This airplane will be practically identical with the 19 except for the lower wing, which will have considerably smaller span.

NOTE.—This plane carries four fixed machine guns firing forward and three swinging machine guns over rear cockpit: has a ground speed of 225 kilometers per hour and a ceiling of 8,000 m.—Ed.

In the engine department I saw an example of the Bréguet-Bugatti engine having 32 cylinders, 16 of which are inverted. The Bréguet Co. now considers this engine to be in a fairly satisfactory state of development.

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4. Visit to Zodiac airship factory.

A visit was recently made to the Zodiac airship factory at Puteaux, near Paris. This is the only factory constructing airships in France at the present time, as the Nieuport-Astra Co. is not working on lighter-than-air craft.

The last airship completed by the Zodiac Co. was the *VZ-24*. This airship is in the naval service and is stationed at Rochefort (nonrigid type).

The Ministry of Marine has now settled on two sizes of airships to be built. The smaller size is of 3,000 m^3 (105,944 cubic feet) and the other of 10,000 m^3 (353,145 cubic feet). Designs have been prepared for each size, both as a nonrigid and as a semirigid. Both types of airship will be well stream lined and the external rigging of the nonrigid type reduced as much as possible.

Construction has been started on a 3,000 m^3 (105,944 cubic feet) nonrigid airship. This will carry a crew of four men (two pilots, wireless operator, and mechanic). The total useful load, including ballast, equipment, etc., and fuel for 10 hours' flight at 70 kilometers (43.5 miles) per hour cruising speed, will be about 1,000 kilograms (2,205 pounds).

The airship will be equipped with two Salmson 120-horsepower air-cooled engines (type 9 AC) giving a maximum speed of 90 kilometers (55.9 miles) per hour.

A semirigid 3,000 m^3 (105,944 cubic feet) airship, having the same general characteristics as the nonrigid type, is on paper. This airship will have a speed of 95 kilometers (59 miles) per hour.

Construction was started on a 10,000 m^3 (353,145 cubic feet) nonrigid airship, but this has been stopped as it was found that the total height of the airship (22 meters—72.2 feet) was too great to allow sufficient maneuvering space to be housed in the smaller type of standard airship hangars used in France. These hangars are 24 and 28 meters (78.7 and 91.9 feet) in height. This airship was to have had two 400-horsepower Loraine Dietrich engines, giving 300 horsepower each, and permitting a maximum speed of 90 kilometers (55.9 miles) per hour.

Construction of a 10,000 m^3 (353,145 cubic feet) semirigid airship has been just started and I was shown a model of the airship and a close-up of the car. This airship being of the semirigid type has a keel running along its entire length and divided into six sections joined together to permit flexibility.

I was shown a section of the keel. This is composed of a duralumin girder about 20 inches square in section. In the interior of the girder are housed the fuel and ballast tanks. The sides and bottom of the girder are made up of angle sections suitably triangulated by other angles. The cross bracing on top of the girder is composed of channel sections on the top of which is placed the flooring of the walk way. The air scoop for the ballonets forms a forward prolongation of the keel about 2 feet in length.

The main car is placed fairly far forward. In the bow is the navigating compartment with a bay window in the nose allowing view straight downward. Amidship on the port side is the radio compartment, complete with radio direction apparatus, flanked by a corridor on the starboard side. Further aft is a large compartment with two bunks and in the stern is a lavatory. This car is attached directly to the keel, access thereto being a ladder.

Toward the stern is a small streamlined structure attached to the keel carrying the two engines on outriggers braced externally to the hull. These engines are at present intended to be the 450-horsepower Lorraine Dietrich W type, but it is quite possible that 400-horsepower Gnome-Rhone Jupiters may be substituted. It is hoped that in any case 110 kilometers (68.4 miles) per hour will be attained.

In order to distribute over the keel the concentrated weights of the two cars, wire cable catenaries run from the bottoms of the two cars forward and aft up to the keel. The four thick tail fins have their external bracing reduced to the minimum.

The crew will consist of 8 or 9 men, ballast, equipment, etc., and fuel for 30 hours' flight at 75 kilometers (46.6 miles) per hour cruis-

ing speed. The dimensions of the airship will be approximately as follows:

Length, 80 meters (262.5 feet).
Height, 20 meters (65.6 feet).
Maximum diameter, 16 meters (52.5 feet).

GERMANY

A. AERONAUTICAL

1. The Junkers Aircraft Factory.

[Source: German press]

The sharp fall of the aircraft market both at home and abroad has led to a fatal reduction of work in the Junkers Works in Dessau. The communal organizations for the assistance of the unemployed will have to provide for 1,800 workmen who will soon be discharged from the Junkers Works. The decline of the market is due firstly to the restriction of German aircraft production by the "Definitions," for whose abrogation Germany has been vainly fighting for years, and, secondly, to the growth of home aircraft construction in the countries which had hitherto been dependant upon the import of Junkers airplanes. If the Paris political conferences do not lead to an improvement of the conditions of German aircraft production, the Reich will have to take measures to support the Junkers concern, to which it owes a debt of gratitude.

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2. Press reports on the German seaplane competition at Warnemuende.

[From the Berliner Nachtausgabe]

The great German seaplane competition is over. Of the 18 planes which entered, only three finished the competition, which isn't many, but all the rest dropped out of the race or were disqualified. Therefore the following question is justified: Has the competition brought us any further and have the results attained justified the means expended to attain them? I believe that all the participants have returned home very satisfied. Rich experiences have been gathered, both good and bad—the bad are in the majority, but that was to be expected. It is impossible for a whole industry to be dependent and live for years on the experiences of foreign countries.

This is more true of German aeronautical motor construction than of seaplane construction which is being energetically developed. The difficulties which oppose the schematic further development and

which still exist, are very important ones. We lack the assistance of the Government in putting the aeronautical industries on a firm financial basis through the wholesale orders, the latter of which would aid their engineers in attaining a rich technical experience and force them to perfect their types. The construction of German aeronautical motors has only begun the last two years. There is a lack of strong, fully tested and absolutely trustworthy motors. There are practically no air-cooled motors. Siemens, who has been working on the matter for a long time, has never got any further than his 110-horsepower type. Something must be done immediately.

The question is not so serious as far as regards the construction of seaplanes in spite of the fact that the initial difficulties were greater, inasmuch as owing to the aeronautical clauses of the agreements no really efficient airplanes could be constructed in Germany. But our leading aircraft constructors went abroad and engaged in the construction of large seaworthy seaplane types. Why? Because the idea of transoceanic aerial traffic has been growing more and more. The seaplane is a happy complement or supplement to the much slower steamer and makes a rapid service that can never be attained with seafaring craft. But safety is a vital factor in this question—safety in the air and safety on the water. As the traffic will be transoceanic, the greatest weight must be laid on absolute seaworthiness. But we are a long way off from this as yet, a fact proved conclusively by this seaflight competition. The two demands, flight performance and seaworthiness, are in mutual opposition.

In order that a small airplane be strong and seaworthy it must be heavy in construction. But heavy weight reduces the flight performance. Therefore the smaller the airplane the more difficult it is to make it seaworthy. The seaplanes are therefore all large in type, and in order to make them strong, steel is used for their construction. The duraluminum which is now used can therefore be viewed merely as a makeshift which is doomed to be abandoned even as is wooden seaplane construction to-day. The seaplanes will attain sizes as yet undreamed of and impossible in land planes, owing to the lack of suitable flying fields and the strains on the material due to landing. The modern seaplane will anchor at buoys even as seagoing vessels, and there will be docks for repair work; hangars will only be used at the seaplane factories.

What constitutes the seaworthiness of a plane? In answering this question two characteristics must be differentiated—the sea and maneuvering properties of the plane when landed, and the process of landing and starting, especially in a seaway. The first point is quite clear; it is the same as is demanded of a seaworthy vessel; the second is distinct with the seaplane. We will therefore only

consider the latter. In order to fly, the seaplane, even as the land plane, requires a definite speed. The speed with which the airplane rises from the ground or the water must be a little greater in the case of the seaplane than in the land plane, and the reserve motor power which carries the plane up into the air and holds it there must be greater in the case of the seaplane because the resistance of the water and the pulling up out of the water requires more power than overcoming the resistance in rolling on the ground. The most difficult is the landing and starting in a seaway. The strains on the plane are tremendous.

The competition has shown that in starting and landing in a seaway it often depends more on the pilot than on the plane. The types shown in the competition forced their way through the water, which is all wrong. Only one type cut through the water or slid over it (in spite of the fact that no great demands can be made on the flying boat on account of its small size), and that was the Rochbach boat, a keeled flying boat with lateral floats (strutted) and rear propellers. The Dornier boat, a small Wal with one motor, did not evidence the familiar starting properties of the Wal, as, owing to the arrangement of the propeller up in front, the motor had to operate in the spray water. The two successful types (both twin float planes), the Heinkel and Junkers monoplanes, were both splendid types, representing a further development of the Brandenburg monoplane and the familiar Junkers F–13 type, but they are not high-seas planes. With the existing horsepower, real high-seas planes are out of the question. A small plane can also not be seaworthy on the open sea. The way to the high-seas plane is along the lines of the flying boat, and this way has been pointed out to us. This is the reason that the sea-flight competition was of such consummate importance, because the varied types were tested under the same conditions, and were tested so rigorously that one can only say at the end: "Many are called, but few are chosen."

[From the Berliner Tageblatt]

Especially interesting were the flight performances of the flying boats which were outside the competition. Landmann made a landing with a Rohrbach boat, which was neither pretty nor pleasant and would have cost any float plane its life, but for that very reason was the best proof of the constructive strength of the Rohrbach boat. Shortly before touching the water Landmann raised the front of his boat so high that the fuselage was at an angle of 45° to the surface of the water; he then tilted it over in front and dropped on the water so that the boat lay safely on the waves. The boat started equally well, even though as the heaviest plane in the competition it required more time and had to contend badly with the waves. Roth

on the second Rohrbach boat performed the maneuverability tests, which were the best of the day and unequivocally proved the admirable seaworthiness of this flying boat.

The two Dornier boats failed utterly. It is true they landed satisfactorily, proved their swimming properties, but could neither start or turn the prescribed figure eight. The waves which washed over the fuselage, which was much lower than the Rohrbach boat, prevented the boat from attaining the requisite starting speed, so that finally one of them had to be towed into harbor by a salvage steamer while the other let itself be carefully driven on the coast.

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3. High-seas flying boats.

[By Justus Scheibert in Luftfahrt]

The present low standard of oversea air communication can not be explained by the absence of demand; in fact, the establishment of a regular air service along oversea lines is a question of immediate and vital necessity. It would not have to compete with rapid express trains, as it has to do overland, but only with steamers whose highest speed does not exceed 30 to 40 kilometers an hour, and whose service along some lines is an intermittent one, sometimes at long intervals. The only real competitor with whom air service would have to reckon is the mail steamer, whose speed is not more than 20 to 30 kilometers. The average speed of a flying boat being about 140 to 150 kilometers per hour, the economy of time would obviously be enormous.

The cause of the above-mentioned deficiency lies elsewhere, namely, in the sphere of technique. We have only a very limited number of ocean-going flying boats able to meet all the requirements of safety and seagoing capacity and possessing a sufficient radius of action when fully loaded. The seagoing capacity of a flying boat increases with its size; so does its radius of action, up to a certain degree. If we compare the two existing types of float airplane and flying boat with reference to their seagoing capacity, we must unhesitatingly give preference to the latter, especially considering that its efficiency increases with its dimensions.

Germany takes the lead among all other countries in the construction of ocean-going flying boats. The type of the braceless, all-metal monoplane, exemplified in Rohrbach's and Dornier's constructions, was evolved by German engineers on the basis of pre-war experiments with all-metal aircraft and may be regarded as the most perfect result obtainable along these lines.

In his recent transoceanic flight on a Dornier-Wal flying boat, the Spanish major, Franco, covered the distance between the Cape Verde

Islands and Pernambuco in two days. This is a new record in the history of German aircraft construction added to those already furnished by Amundson's and Locatelli's polar expedition, which gave such striking evidence of the efficiency and seagoing security of the German all-metal flying boats.

One of the chief objects of our future efforts must be the attainment of a better economy by the reduction of the costs of amortization and operation. The productivity of the machine would also be raised by increasing the load limit, but every increase of the load entails a reduction of the radius of action, whereas an extensive radius of action is an essential requisite for transoceanic flight. To compensate this drawback it will probably be necessray to increase the size of the flying boats. In view of this end every improvement of the latter's aerodynamic qualities would naturally be an advantage but the standard already reached in this respect is so high that we can hardly hope to add anything to it with our presently available means.

The seagoing capacity of the flying boat increases with its size, but it is also influenced by other conditions. Measures should be taken to reduce the rolling in a high sea, a strong movement of the boat being liable to produce seasickness, which will prevent the personnel from repairing eventual defects in the motors, as was the case with Locatelli, who was obliged to abandon his Dornier-Wal on that account. A reduction of the rolling would also be a great advantage for the passengers.

The question of navigation demands careful consideration in view of the almost complete absence of fixed points in the open sea by which to take bearings and to the danger of fogs, which is much greater than on land. This is, of course, especially the case in the neighborhood of the main lines of traffic, where the chances of collision are more frequent.

The problem of airplanes for high altitudes is at present very far from any satisfactory solution, but it would be a mistake to leave it unconsidered. An increase of the altitude limit should be attainable with supercompressed motors of extra size, which should be fitted out with compressors, variable propellers, etc. All this does not offer any insuperable technical difficulty; neither does the adaptation of air-tight cabins with artificial ventilation, which would be necessary for the purpose. There is no doubt that an enormous increase of speed can be obtained by these means.

Light metals are the only construction material used at present in view of their unquestionable superiority over the wood and mixed materials formerly used for seaplanes. Whole metal planes offer very considerable economic advantages in view of their durability and their resistance to the action of wind and water, which is much

superior to that of wooden planes. All their connections are held together with rivets, whereas the glue and wire connections on wooden constructions are a constant source of expenditure owing to their frequent need of repairs.

The reliability of construction, which is fixed at a very high standard in Germany, is greatly improved by the exclusive use of metal. Rohrbach is especially careful to have all the parts easily accessible to inspection. He only uses plates, angles, and profiles which have already proved their reliability in marine shipbuilding. He does not use tubular constructions, which can not be inspected internally; his riveting is of the best quality and is open to inspection on both sides.

Metal construction being practically fireproof, the danger of fire is almost entirely eliminated. Further advantages of metal constructions are their insensibility to changes of weather and the lightness of their weight as compared to timber.

Reliability of operation is chiefly conditioned by the efficiency of the motors, taking for granted soundness of construction and a highly qualified personnel. It is becoming a general rule to install several motors, whose performances are so calculated as to allow for the failure of 50 per cent, the remaining half being sufficient to keep the machine going.

The steering ability depends upon the position of the center of gravity, the design and arrangement of the supporting planes, and the dimensions of the steerage control. The stability in flights of long duration must be such that the machine will continue to fly in a straight line for some minutes with a loose rudder.

The question of maneuverability in the water requires careful consideration. It can best be promoted by installing the motors alongside each other, which will allow the boat to be steered into a narrow U-shaped raft independent of wind and seaway. The weatherproof qualities of metal flying boats allow them, however, to float for weeks on the water, attached to a buoy, without being at all damaged.

The Rohrbach flying boat has been especially adapted for disassemblage, with a view to packing and storage requirements. In the large machines the fuselage can be separated into two sections. After removing the nose and tail rib boxes the ring spars can be divided into three longitudinal pieces; the motor cabins and the floats can be detached by removing a few bolts.

The supporting surfaces are being gradually freed from struts and props of any kind. Bracings such as were used by Dornier during the war are being abandoned. An especially interesting pattern of construction is offered by the unsupported Rohrbach box-

spar supporting surface, whose chief advantages are a simple construction from ordinary material, facility of disassemblage, and easy replacement of separate parts, providing possibility of inspection and prompt repairs; extra parts are always available; metal covering of surfaces (the supporting surfaces and steerage control of the Dornier-Wal are covered with fabric); light weight and great solidity wide span, resulting in good lateral ratios and flight performance.

The dimensions of the steering control should always be ample. The aileron should be placed high above the water surface. The steerage guides should lie as straight as possible without any turns and should be open to inspection from all sides. All the steering surfaces must be balanced.

The fuselage is usually in two stages; in order to obtain an easier landing on the water and a better steering ability, the lower stage is run out into a sharp edge. The metal covering acts like a supporting surface and must be of sufficient solidity, especially on the underside. The fuselage is divided into bulkheads in the Rohrbach flying boat; these are disposed of in such a manner that any two compartments can fill simultaneously with water without causing the ship to sink. All the compartments are connected by doors which can be opened and shut with a handle. The general distribution of the interior spaces depends upon whether the pilot's room lies in front or at the back of the cabin.

The side floats are also divided into numerous compartments which can be opened by firmly closing hatch lids. The "Wal" is furnished with Dornier's patented side fins, which are also subdivided into bulkheads and fitted at their ends with two struts for the supporting surfaces.

In view of the length of their flights, the Dornier and Rohrbach flying boats are furnished with double steerage controls. The two pilot seats are built side by side in a well-protected position, which affords a good outlook as well as a view over the whole machine. In the Rohrbach boats the room for the machinist is situated at the back of the pilot room; it is used for storing baggage and mail and is provided with an open hatch.

The cabin should be easy of access, some persons having great difficulty in climbing into it. It should be built according to the rules followed in land-traffic aircraft. It should also be fitted with an appliance enabling communication with the pilot. The windows best fitted for high-sea flying boats are the so-called bull's-eyes; the disposition of the toilet and the rooms for the wireless apparatus, mail and luggage varies according to the general plan of construction.

As mentioned above, technical and operative considerations have shown the advisability of employing several motors. The tandem disposition of the two motors in the Dornier flying boats is patented. The advantages offered by this disposition compared with a lateral one are those of simplicity of construction, owing to a single car being used for both motors, and absence of danger of deviation in case of failure of one of the motors. It has, however, the inconvenience of causing the rear propeller to work at a disadvantage in the air current produced by the front motor. It should be noted that an eccentrical disposition of the motors does not necessarily involve impossibility of flight in case of failure of one of them; an adequately built airplane will even be able to execute turns on the side of the running motor. The motors must be easily accessible from all sides. The coolers usually employed are frontal ones.

The fuel system must be reliable and fireproof. The Dornier-Wal carries a supply for eight hours' flight—five tanks containing 280 liters each. The fuel passes from these into a receptacle out of which it is pumped with a fan-blade pump into a gravity tank situated in the motor gondola, from which the motors are fed. A hand pump is also available. The conduction from the storage tanks to the gravity tank is a double one; each pipe can be fed either with the hand pump or with the mechanical pump. Rohrbach uses a similar arrangement, with the difference that each motor has its own special conduit; in case of need both conduits can be made to communicate so as to supplement each other. The main benzine supply is stored in the supporting wings.

In order to provide security against wind and seaway in case of failure of the motors, the Rohrbach flying boat is furnished with sailing gear. The masts and beams consist of tubes of duraluminum, made up of separate pieces which can be easily stowed away.

B. MISCELLANEOUS

1. Advancement in Diesel-motor construction.

[Source: German press]

The progress of technic is not impeded by the general economic depression. The M. A. N. is building double-acting two-cycle Diesel motors with a maximum performance of 7,000 horsepower. The holders of the M. A. N. license, Bloehm & Voss, Hamburg, are building a similar motor of 15,000 horsepower for the Hamburg Electric Works. The vast progress evidenced by these achievements is the more astonishing because the Diesel motor did not exist before the last third of the last century. The original construction was

a single working, four-cycle motor with a performance of about 20 horsepower, which gradually increased to several thousand horsepower. These vertical, single-acting four-cycle motors are still being built in great numbers. We furnish the whole world with them; at the present moment a new series is under construction for a large Chilean saltpeter concern. The same system of Diesel motors was produced by hundreds in Augsburg for the use of submarines. The highest record in this type was a 3,000 horsepower, 10-cylinder motor designed for the last great submarine cruiser.

The power developed by these motors does not, however, satisfy the present demands of motor-ship construction or those of the great central power plants on land. An intermediate type between the original Diesel motor and the present giant Diesel engines is offered by the horizontal, double-acting, 4-cycle motors and the vertical double-acting 2-cycle motors with valve scavenging built by the M. A. N. Works in Nürnberg. A maximum performance was attained with this type in a Diesel motor designed for a German battleship, which was never installed, owing to the close of the war, and which was subsequently scrapped in obedience to the dictates of Versailles.

The main point in the latest motors is the method of scavenging the supply, being effected in such a manner that the current reverses automatically in the interior of the cylinder, providing a rapid elimination of the combustion gases. These motors have no valves, instead of which they are provided with ports through which the escape of the exhaust gases and the supply of air is effected. The perfection of the scavenging insures good economy, owing to the low fuel consumption. A 6-cylinder, double-acting, 2-cycle motor of this type with port scavenging has actually been completed in the M. A. N. Works at Augsburg; it is designed as main engine for the single-screw freight ship *Rameses* of the German Australian Shipping Co., Hamburg.

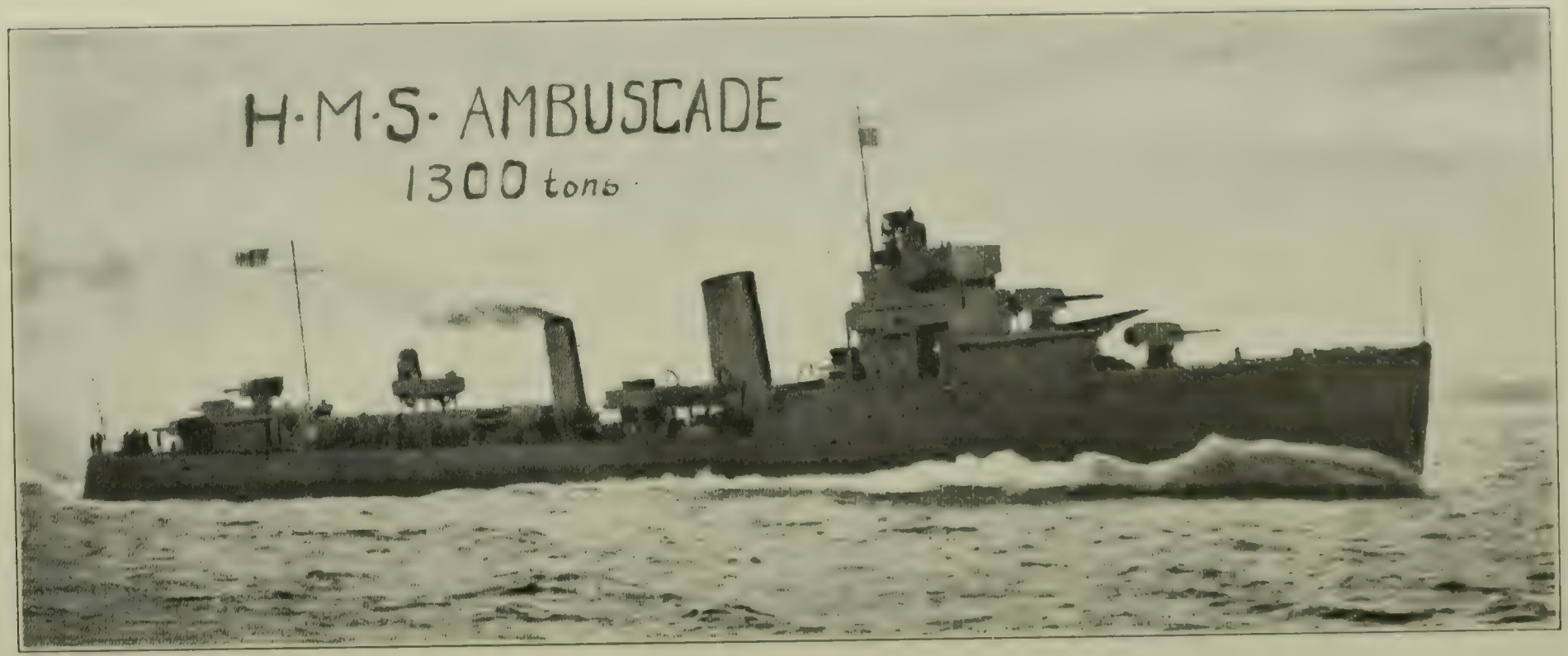
GREAT BRITAIN

A. NAVAL

1. H. M. S. "Oberon."

The frontispiece shows a bow view of the new English submarine *Oberon* (Ex. O–1). Laid down in March, 1924, she was commissioned last September. Her displacements are 1,480 slant only 1,750 tons and she has six bow torpedo tubes only. Details of her construction and equipment have been kept very confidential by the British Admiralty. But it is known that she was designed primarily for over-

H·M·S·OBERON
1480/1750 tons·


H·M·S· AMBUSCADE
1300 tons

seas service and hence for seaworthiness and extensive radius of action. The two submarines recently launched for the Australian Government are of similar design to the *Oberon*, and provision is made in the current navy estimates for laying six more of these "O" type submarines, but no contracts have yet been awarded. Also in 1928 and 1929 six boats of the "O" type are to be laid down, and in 1930 five of this type and one fleet submarine. The photographs of the *Oberon*, facing pages 1 and 30, give a view of her underwater body.—Ed.

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2. *Cruiser construction.*

[Source: English press]

The launch of a 7,000-ton cruiser, the *Aoba*, for the Japanese Navy last week is a reminder that the progress of our late ally in the construction of vessels of this class has been retarded of late. The outstanding feature of a review of the world's warship building in the period immediately following the war was the cruiser construction undertaken by Japan. She laid down, in the years 1918 to 1922, inclusive, no less than 17 vessels, of which 14 were of 5,500 tons and capable of 33 knots speed. Moreover, there was no slackness in the rate of output of these ships. The *Nagara* was laid down at Sasebo in September, 1920, and finished in April, 1922—a year and seven months. At the same place, the *Yura* was laid down in May, 1921, and finished in March, 1923—a year and 10 months. A similar period was occupied by the *Kinu*, at Kobe, which was laid down in January, 1921, and completed in November, 1922. But the effect of a move to a larger displacement of 7,000 tons, and to an armament of 8-inch guns instead of 5.5-inch, has been to lengthen very considerably the construction period. Laid down in 1922, the *Furutaka* and *Kako* are only just through their trials. Laid down in 1924, the *Aoba* and *Kinugasa* are only now at the launching stage. The former have been nearly four years in hand; the latter have been well over two years before taking the water.

Although much has been heard during the past three years about cruisers of what may be called the Washington standard type—that is, up to the maximum displacement of 10,000 tons allowed by the conference of 1921–22—it does not appear to be generally known that very few of this class are yet afloat. Japan, it seems, has yet to launch her first 10,000-ton cruiser. She laid down two in 1924, the *Nachi* and *Myoko*, and two in 1925, the *Ashigara* and *Haguro*. The *Nachi*, which was the most advanced, had the misfortune to be severely damaged by a dockyard accident a few months ago, when two cranes fell from a considerable height across her. It is indeed curious that while postwar naval rivalry is supposed to be most

intense between Japan and the United States, neither power has yet a 10,000-ton cruiser in the water. We may expect to hear any day of the launching of one of the four Japanese ships in this category, but in America the first 10,000-ton cruisers are only being laid down this year, the *Pensacola* and *Salt Lake City*. Oddly enough, the first country to launch a ship up to the Washington maximum was France. Her ship, the *Duquesne*, took the water on December 17, 1925, and was followed on August 24, 1926, by the *Tourville*. A third of the series, the *Suffren*, was laid down on May 3 last. Italy has two 10,000-ton ships, the *Trento* and *Trieste*, in hand, but neither is yet afloat.

If it were only contemporary ships of the Washington standard type which the Admiralty had to take into account in fixing its program, it would have a simple task. As was often pointed out during the discussions which preceded the adoption of a five-year program last year, there is the considerable leeway of the six years from 1918 to 1924 to be made up, during which the Japanese put in hand 19 ships and the Americans 10; and there is also the very heavy "tail" of semiobsolete British cruisers which will become due for scrapping almost simultaneously. The first five ships of the replacement program—the *Suffolk*, *Cornwall*, *Kent*, *Berwick*, and *Cumberland* (10,000 tons)—have all been launched this year. The next four 10,000-ton ships, authorized in 1925, have been laid down, the *London* and *Devonshire* at Portsmouth and Devonport, and the *Sussex* and *Shropshire* by contract. Before very long we should hear something of the three ships in the 1926 estimates, one of which will be built at Portsmouth and the other two by contract. These ships will not all be of 10,000 tons, as one is to be the first of a new intermediate type of cruiser of 8,000 tons. But very little work can be done upon these three ships this financial year, owing to the small sums allocated to them in the estimates, amounting in one case only to £962. The most liberal of the first appropriations this year was reserved for the submarine depot ship just ordered from Messrs. Vickers, which will be driven by motor engines of a German type.

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3. New destroyer orders.

On their completion, the *Amazon* and *Ambuscade*, the first post-war destroyers now being fitted out by Messrs. Thornycroft and Messrs. Yarrow, respectively, will be attached temporarily to the Atlantic Fleet, pending a final decision as to their allocation. During this period the ships will proceed in company on a cruise for trials to the Tropics, visiting Gibraltar, Lagos, and Sierra Leone.

NOTE.—These boats displace about 1,250 tons, mount four 4.7-inch C. L. guns, and will have a speed in excess of 37 knots, which is 1 knot higher than the designed speed of any previous British destroyer. Twenty-seven more boats of this class are to be built under the present program. Photograph shows the *Ambuscade* on her trial runs.—Ed.

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4. Battle cruiser landing-force operations.

Operations were recently carried out on the Shandwick Peninsula, but the results were disappointing. At 4 o'clock in the morning the *Hood* and the *Repulse* slipped out of harbor without lights, carrying a Red landing force, the objective being to destroy the wireless station at Nigg. They progressed out of the Firth, and anchored at 5 o'clock off Shandwick. A fairly heavy swell which was running caused great difficulty in manning the landing boats, and their complements had to be reduced by half. Moreover, the row to the beach occupied 75 minutes instead of half an hour.

The plans for the attack called for 1,000 sailors and marines from the ships, supported by four flights of aircraft from the *Furious* and gunfire from the *Hood* and *Repulse*, while Shandwick was to be defended by 400 sailors and marines, supported by three companies of the Second Black Watch with machine guns, and two airplane flights from Novar aerodrome.

The Blue defending force had prepared, during the night, an ambush with two armored cars and machine guns, and had mined the beach. In the growing light of dawn the gray hulls of the battle cruisers finally took detailed shape, and the black blobs of boats laboring shoreward were revealed. At the signal given by red rockets, gas and smoke cylinders were released from the beach and a black cloud rolled menacingly toward the invaders, who by this time wanted no extra encouragement to be ill.

The use of gas, however, proved a great mistake on the part of the defenders, because the boats were screened from machine-gun fire until they were within 200 yards of the beach. The scanty garrison, therefore, only had time to fire a few belts before decamping. The laden boats made a final rush to the beach, but only five were successful, for the swell dashed some broadside on and swept others back seaward. Only about 100 very wet and squeamish troops and marines struggled ashore through several feet of water.

A second boat flotilla turned and made for Shandwick Pier, but suddenly the drone of airplane engines was heard and a Blue flight from Novar swooped upon them. The Blue airplanes had half an hour's untrammeled execution, swooping down to a few feet and then "zooming" over the village before the rival flights appeared.

These even then were far slower than their rivals and many must have been shot down.

I am firmly convinced that in real warfare the landing would have cost 70 per cent of effectives or more, if the defending machine guns had been resolutely handled; in fact, it was again proved impossible to disembark troops on an open beach except in the most favorable weather.

The survivors hurried advance parties up the road with commendable speed, and showed a suspicion of strangers which enabled them to arrest a spy, a midshipman on a motor cycle, in spite of his splendid attempt at bluff. Unfortunately, the second main experiment desired, namely, the efficiency of naval ratings in land defense, could not be made properly. Short complements meant a lack of landing boats, and the tide receding hourly increased the difficulty of landing. The result was an insufficiency of troops for an advance in force till very late.

The Blue defense force, which had taken up an outpost line at 5 in the morning, maintained its concealment well for many hours, but by 10 o'clock it was impossible to keep men doing efficiently that most difficult thing—nothing—in a biting wind on a bleak hillside. Nevertheless, their position had been excellently chosen, and visual communications were spendidly maintained. The Blue airplanes effectively dropped messages, while the Red maintained wireless contact with the fleet, whose gunfire would doubtless have made a great difference, and might have prevented the apparently successful harrying of the advancing troops from the air.

The operation was vigorously and equitably controlled by a large force of umpires, which, thanks to the above-mentioned lack of boats, appeared the strongest unit in the field.

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5. Press notes on recent activities of the Atlantic Fleet.

The Atlantic Fleet began firing practice last night. From the *Marlborough*, anchored near the coast, the horizon appeared like an enemy trench in war time, owing to the magnificent display of star-shells fired from the ships at sea.

This morning the *Marlborough* began high-angle gun practice under new control and range-finding systems. Her guns fired at targets consisting of smoke shells, which had been fired to varying heights. This morning the practice was a failure, owing to low clouds concealing the targets and the bursts, but better conditions this afternoon permitted of fairly thorough tests, although the targets naturally were not moving as an attacking airplane would be.

It was proved possible to group a barrage with great accuracy near such targets, but there was a considerable interval between sighting

them and opening fire. It also appeared difficult to transmit corrections of errors between shots, and some instruments seemed to be rendered unsteady by the terrific blast of the guns. It was, however, the first practice under the new system, and a great improvement was manifest before the end of the firing. I was personally impressed with the obvious development which has been made in defensive gunfire against airplanes since the war. At the final practice fire was opened 43 seconds after sighting the enemy.

This evening there has been a searchlight practice from ships at anchor, endeavoring to pick out an enemy represented by drifters. They were spotted almost immediately and held under the converging glare of lights from three battleships.

The Atlantic Fleet has recently been at sea engaged in exercises. It must be clearly understood that these exercises do not partake of the nature of naval maneuvers, but are operations carried out by ships individually or in pairs. These operations have comprised, in the main, firing and torpedo practices. The firing has in some cases been what is known as subcaliber. But in all possible respects the practice is made to approximate the real thing. The experience of years has enabled extraordinary precision to be attained when these guns are being fired with their full charge. It has also taught the precautions that are necessary to avoid mishaps. When firing subcaliber there is not, of course, the same risk, but nevertheless the precautions are most resolutely observed. Indeed, so much is this the case that as far as human ingenuity can make it so the firing of these guns has been rendered foolproof.

The *Revenge* and *Royal Sovereign* have engaged in night-firing exercise. In these practices the big guns were used with full charge. The idea was to search out the target by means of star shells and, having secured it, to open fire.

In pursuance of the program for the exercises, the battleships *Marlborough*, *Emperor of India*, and *Iron Duke* left Ivergordon this morning for northern waters. Outside of the harbor the ships separated for individual training, two of them intending during the next two days to proceed with big-gun firing and the other with anti-aircraft experiments. The *Revenge* will execute night firing during the week and probably other battleships will do the same, but not the *Marlborough*, because there are 410 boys on board, training, and it is therefore considered too dangerous. *Marlborough* anchored off Golspie after a good journey at slow speed owing to fuel economy.

Virtually the whole of the Atlantic Fleet is now at sea in preparation for the battle which is to open to-morrow morning.

The engagement has been planned on ambitious lines, and in the variety of practices which it will involve as well as in scale it will be the most interesting operation of the autumn exercise. The opposing fleets will be on the one side a "Red" force comprising *Revenge*, flagship of the fleet, with Admiral Sir Henry F. Oliver, commander in chief, who will lead the "Red" fleet; *Royal Sovereign*, of the second battle squadron; *Iron Duke*, *Marlborough*, and *Emperor of India*, of the third battle squadron; and the second cruiser squadron comprising *Curacoa*, *Cleopatra*, *Comus*, and *Cambrian*. The opposing "Blue" force will be led by Vice Admiral C. T. M. Fuller, commanding the battle cruiser squadron, consisting of *Hood*, *Repulse*, and *Renown*. The battle cruisers will be supported by the fifth and sixth destroyer flotillas. Several flights of airplanes will take part and they will all be based in the aircraft carrier *Furious*. To assist the "Red" force there will be torpedo planes, fighters, and reconnaissance and spotting planes, while the "Blue" force will have the help only of reconnaissance and spotting machines. The principal object of the exercise will be to give gunnery and torpedo practices under full power, to exercise torpedo aircraft and destroyers in attacking ships steaming at high speed, and to exercise aircraft in fleet action.

The general idea of the operation is that the battle cruiser squadron, acting in defense of an imaginary battle squadron, engages a weaker "Red" force represented by the second battle squadron. The "Red" ships will attempt to fall back upon the main fleet, which is represented by the third battle squadron. The battle cruiser squadron will pursue them, but on sighting the powerful heavily armored ships of the third battle squadron will endeavor to retire, covering the retirement by means of a destroyer attack.

The battle will, in one respect at all events, be a particularly realistic representation of an actual sea engagement. The 15-inch guns on battleships and cruisers will fire full caliber charges at targets moving at high speed, and the aircraft attacks will be carried out under conditions which will approximate closely to the real thing. The destroyers, in their share in the engagement, will also be given an opportunity of displaying the peculiar qualities which have made this branch of the British Navy famous for initiative and adventure.

We have had the privilege to-day of witnessing a realistic imitation of a sea battle. A squadron of battleships and light cruisers, screened by destroyers, made a determined attack on the battle cruisers.

The action opened by the destroyers, who were steaming across the battle cruisers about 4 miles distant, suddenly emitting dense vari-colored clouds of smoke, which rolled toward the enemy like the breath of some immense volcano and seemed to stretch from sea to sky. Into this artificial night dashed a couple of cruisers. The battleships rounded the corner of the smoke screen and there were the enemy, straight ahead with every gun trained and waiting. The battleships immediately turned to port and steamed on a course parallel to the enemy, their guns slewing around to bear. With a crash that rocked the ships they spoke.

Then from the side of every ship came a swirl in the water as the torpedoes were fired. They were so many that a miss seemed impossible; and so, in fact, it was, for through glasses one could seem something leap from the water and strike the *Hood* amidships. The *Renown* also appeared to be struck and fired a torpedo in reply, which was avoided by a sharp turn. The battle cruisers also found little difficulty in avoiding other torpedoes, and the fact that they were struck was not depressing, because it must be rare, indeed, that capital ships in warfare fire torpedoes at each other, and the discharge to-day was not impeded by gunfire.

This morning the *Marlborough* carried out further antiaircraft experiments, this time with a real airplane as target, firing only small-caliber shells with short fuses. The improvement on yesterday was almost unbelievable, the guns ranging on the target with great speed and accuracy.

The fight in the North Sea, in which virtually the whole Atlantic Fleet was engaged, was in the agreement of all concerned a very good battle. It produced a series of engagements by sea and in the air, which culminated in a picturesque torpedo attack by two flotillas of destroyers. The plan of operations was briefly this: The battle-cruiser squadron of the Blue force—*Hood*, *Repulse*, and *Renown*—sights and pursues a weaker Red force, represented by the second battle squadron—*Revenge* and *Royal Sovereign*. An engagement ensues, and the Red force falls back fighting on its main fleet, represented by the third battle squadron—*Iron Duke*, *Marlborough*, and *Emperor of India*. Upon sighting the Red main fleet the battle cruisers endeavor to retire upon their own battle squadron.

It was unfortunately denied the *Repulse* to take part in the forefront of the battle, and that ship had to be content with meeting various attacks by cruisers and torpedo craft and with covering the retirement with a high-speed destroyer attack while the battle of the big ships raged invisibly. The *Repulse* had to meet an impertinent attack by the second cruiser squadron, *Cleopatra*, *Conus*, *Curacoa*, and *Cambrian*. Scarcely had the cruisers ceased to annoy her when a flight of torpedo aircraft from the plane-carrier *Furious* came on to a close-range attack. *Repulse's* high-angle guns engaged them theoretically, and they flew off to pester the *Hood* and *Renown*, which had reappeared, steaming at high speed in their retirement from the main enemy fleet with the consorts of the *Repulse*.

The attack on the Red force by the fifth and sixth destroyer flotillas achieved, so far as one could observe, its tactical purpose of covering the retirement of the battle-cruiser squadron from a fleet of battleships which was too strong for it. The destroyers, 15 in number and led by the light cruiser *Centaur*, appeared steaming very fast. Their forecastles were awash; their sterns rode low in the sea: each ship followed straight in the wake of that ahead. Their line stretched over a mile of broken white-capped sea. Turning in a fine sweep, they protectingly encircled the *Hood* and *Renown* and sped away in perfect formation toward the enemy battleships, whose high turrets could be discerned shadowly in the distance. Their attack concluded, the destroyers, throwing out a smoke screen, returned to the battle cruisers. The *Hood* and *Renown* joined in the screen, the immense funnels of the former belching great columns of smoke, which in a few moments impenetrably concealed us from the enemy.

On the bridge of the *Revenge* all was quiet and dark, no lights being visible except our steaming lights and those of the *Royal Sovereign*, our next astern.

Suddenly there came a quiet sharp order giving a bearing and the words "Open fire!" Two searchlight beams shot out from abreast the funnel and picked up two small white specks broad upon the starboard bow, moving at high speed.

The seven 6-inch guns of our battery fired together. Scarcely had the spurts of white foam of the falling shell appeared short of the target when the *Royal Sovereign* joined in from astern and we fired again.

The next three minutes was a series of crashes, and the target passed through a foam of splashes of the falling shells. The impression left was that no destroyer could have fired a torpedo or have survived the storm of fire of those few minutes.

HEAVY GUNFIRE

We were not the only ships firing, for there was a fine display of star shells away on the horizon, where some one was attacking somebody else. Even after midnight the sound of heavy gunfire was heard, for the battle cruisers were at practice with their 15-inch guns.

At daylight this morning the same restlessness was evident. Visibility was none too good, and caused a small delay when we joined the Third Battle Squadron and the targets.

About 10.30 began an hectic 20 minutes, during which *Revenge* and *Royal Sovereign* fired 15-inch and 6-inch guns and torpedoes at one target, and then turned and fired the 6-inch guns upon the other side at another one. The great ships looked splendid as they opened fire with all their guns.

From the reports of the invisible aircraft and from what one could see through the smoke from the bridge the shooting was very good, indeed. The successful carrying out of a practice such as this is a high achievement, which tests the efficiency of the ships, both in material and personnel to the uttermost.

A realistic naval battle at full speed took place in the North Sea on Wednesday, in continuation of the autumn exercises of the Atlantic Fleet.

As the *Revenge* led the *Royal Sovereign* to the northeastward, the battle cruisers appeared hull down to the northward, and the Second Light Cruiser Squadron was soon below the southern horizon. The aircraft carrier *Furious* passed close across the bows of the *Revenge* and soon afterwards the battle cruisers made an imposing spectacle as they steamed at high speed across the flagship's stern.

By 9.30 there was nothing in sight except a destroyer, who was emitting enormous quantities of dense black smoke. She was severely admonished by the flagship for making such a dirty mess in the clean air of the morning. She apologized and explained that some small mishap was the cause of the trouble, but it was some time before she became as smokeless as the rest of the fleet.

At 10 o'clock two " enemy " battle cruisers were sighted hull down to the southeast. The *Revenge* opened fire. The enemy replied shortly afterwards.

HOOD'S SMOKE CLOUD

As the *Revenge* steered a course to rejoin her main battle fleet, which was led by the *Iron Duke*, the *Repulse*, which represented a disabled battle cruiser, was being attacked by the Second Cruiser

Squadron. When the battle squadron formed up astern of the *Revenge*, the "enemy" had had enough, and the *Hood* emitted an enormous cloud of smoke, into which she and her consorts disappeared.

But out of the smoke came a mass of destroyers, which at one time came under the fire of the whole battle squadron. They could not have lasted long, but had time to fire their torpedoes with a rapid turn at the critical moment. The Battle Fleet avoided the cloud of torpedoes running toward them. The same turn also frustrated a cunning flank attack made by the *Centaur*, and her torpedo passed well astern of the *Revenge*.

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6. *Fighting stations of British flag officers at Jutland.*

Ship	Personnel	Where stationed
Iron Duke, flag of commander in chief.	Commander in chief	Upper bridge.
	Chief of staff	
	Captain of fleet	
	Flag commander	
	War staff officer (torpedo)	
	Signal commander	
	War staff officer (strategical)	Fore top.
	Flag captain	Conning tower.
	Navigating officer	
	Secretary	
	(G) and (T) officers	
Lion, flag of vice admiral commanding Battle Cruiser Fleet.	Vice admiral commanding	Upper bridge.
	Chief of staff	
	Flag lieutenant	
	Secretary	
	Flag captain	
	Navigating officer	
Benbow, flag of vice admiral commanding Fourth Battle Squadron.	Vice admiral commanding, staff	Conning tower in early stages; then bridge.
Barham, rear admiral commanding Fifth Battle Squadron.	Rear admiral commanding	Bridge.
	Flag commander	
	Flag lieutenant	
	Flag captain	

Position of plotting station and means of communication

Ship	Plotting station	Communication
Iron Duke	Strategical plot: Admiral's chart house on lower bridge.	Personal touch.
	Tactical plot:	
	Upper bridge	Do.
Lion	Chart house	Do.
Benbow	Lower conning tower	By means of tube between upper and lower conning towers.
Barham	Chart house	Personal touch.

7. *Entry of naval cadets, Royal Navy.*

The following table shows the number of naval cadets entered in the British Navy for the period September, 1925, to September, 1926:

Type of cadet	Date of entry			
	September, 1925	January, 1926	May, 1926	September, 1925
Dartmouth	50	50	48	48 plus, probably 2 from Dominions.
Special entry (executive)	22	15	(1)	It is anticipated that numbers required, viz, 10, will be entered.
Special entry (engineering)	27	19	(1)	28.
Entries from mercantile marine training establishments.	2	3	3	5.

[1] No entry.

The wastage among these entries prior to reaching commissioned rank averages about 14 per cent.

About four Dartmouth cadets per term volunteer for engineering duties, or a total of 16 per year. Cadets from the mercantile marine training establishments are entered primarily for executive duties, and it is anticipated that only a very few will transfer to engineering duties.

Thus, from the past year's entries at Dartmouth, it is expected that about 153 will be commissioned in the executive branch and about 16 in the engineering branch. The corresponding figures for the special-entry cadets are 40 for the executive branch and 64 for the engineering branch. Assuming that none of the cadets in the mercantile marine training establishments transfer to engineering duties, the total addition to the commissioned executive branch would thus be 206, and to the engineering branch, 80.

During the past year 5 enlisted ratings were promoted to acting mate and 5 also to acting mate (E).

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8. Acquisition of land for Singapore naval base.

[Source: Singapore press]

Considerable stretches of the sea coast of Singapore Island and portions of two islands are to be acquired by the Government for military purposes.

The islands Pulau Ubin and Pulau Tekong Ketchil are situated in the eastern approaches to the Johore Straits, and the quarries on the former island supplied the granite for the Johore Causeway. The naval base and aerodrome sites are farther up the straits, and the islands are doubtless required in connection with these admiralty works.

B. AERONAUTICAL

1. Royal Air Force table of flying hours before overhaul of airplanes.

	Number of hours	
	Normal, A	Maximum, B
Land planes at home	400	500
Land planes in Iraq, Middle East, and India	300	400
Sea planes and ship planes operating from carriers or over the sea from shore bases	250	300
Ship planes housed on shore and operating at shore bases	350	400

2. The fleet air arm.

[By Maj. P. L. Holmes, D. S. C.]

The duties of the fleet air arm may be gauged by the official designations of the flights which go toward its composition. These are fleet fighter flights, fleet spotter flights, fleet reconnaissance flights, fleet torpedo flights, and coastal reconnaissance flights.

The fleet fighter flights are at present equipped with single-seater airplanes of the Fairey "fly-catcher" type; their duty is to attack, drive off, and, if possible, destroy enemy aircraft which may approach the fleet; to escort other types of fleet aircraft, and to machine-gun the antiaircraft guns crews on the decks of enemy ships while torpedo aircraft are delivering an attack.

The fleet spotter flights are equipped with Blackburn "Blackburn" and Avro "Bison" airplanes fitted with 450-horsepower Napier "Lion" engines, their duty being to spot for the guns of the fleet while in action and to assist generally in fire control.

The fleet reconnaissance flights are equipped with Fairey III–D seaplanes, Napier "Lion" engines, and their duty is to search for enemy craft and report their movements.

The fleet torpedo flights are equipped with Blackburn "Dart" airplanes, Napier "Lion" engines, and their duty is to deliver torpedo attacks against enemy ships.

The coastal reconnaissance flights are equipped with Fairey III–D seaplanes and supermarine "Southampton" flying boats, twin Napier "Lion" engines; their duty is to patrol from shore bases in search of hostile craft, carry out antisubmarine operations, and escort convoys of merchant ships.

According to a recent Air Force List, the fleet air arm consists of 20 flights, distributed as follows:

Atlantic Fleet.—Three fighters, three spotter, two reconnaissance, and two torpedo flights.

Mediterranean Fleet.—Two fighter, one spotter, two reconnaissance, and one torpedo flight.

China station.—(H. M. S. *Vindictive*), one fighter and one reconnaissance flight.

Calshot.—One coastal reconnaissance flight.

Malta.—One coastal reconnaissance flight.

If the average strength of a flight is taken to be six first-line aircraft, the total active strength of the fleet air arm in home and foreign waters is 120 aircraft, comprising 36 fighters, 30 fleet reconnaissance seaplanes, 24 spotters, 18 torpedo planes, and 12 coastal reconnaissance aircraft. In addition to this there are, of course, service types of aircraft employed for instruction and experimental work.

This scarcely appears to be an adequate air arm for a fleet responsible for the protection of the British Empire and its vast sea communications. The most serious weakness would appear to lie in the fighters. Not only are the fleet fighter flights numerically small, viz, 30 airplanes for the combined Atlantic and Mediterranean Fleets, but the machines are of a type which must now be regarded as obsolete.

The United States Navy has recently given orders for two types of modern single-seater fighter seaplanes in quantities. These are the *Curtiss Hawk*, 430 horsepower Curtiss engine, having a top speed of about 145 miles per hour; and the *Boeing* FB–3, 600 horsepower Packard engine, having a speed of 161 miles per hour. These seaplanes will soon be the service fighters of the United States Navy, and with the added advantage of having floats they could make rings around our present fleet fighter airplanes. These machines are, presumably, connected with the policy of fitting catapult-launching devices to the reconstructed United States battleships and other vessels in the American Fleet.

Clearly, the British Navy can not afford to be inferior in any branch to that of even a friendly power, so that the matter of fleet fighters must be regarded as urgent.

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3. Command in aircraft carriers.

[Source: M. I. D.]

On a recent visit to airdromes in the south of England the following was learned with reference to the operation of aircraft carriers:

(1) Aircraft carriers are at all times under the command of the ship's captain (naval officer commanding).

(2) The Royal Air Force troops on board are under the immediate command of a Royal Air Force officer, who was at one time desig-

nated as "Officer commanding, R. A. F." It seems that this designation has been changed to "Chief pilot," due to the fact that the navy objected to having two commanding officers on one craft.

(3) The entire operation of the carrier and the aircraft is controlled by the naval officer commanding, excepting in cases where he orders impossible operations by the aircraft, in which case a strict adherence to regulations allows the chief pilot to refuse to attempt such operations.

This situation does not seem to be particularly satisfactory either to the Navy or the Royal Air Force.

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4. Royal Air Force display, Hendon.

Following is a list of the new and experimental types of aircraft shown at the display:

"Pterodactyl"

This is the tailless monoplane designed and built by Capt. C. T. R. Hill and equipped with a 34-horsepower Bristol "Cherub III." It was designed for aerodynamic research and apparently can not be stalled.

The tips of the back swept wings are pivoted and act as elevators and ailerons. A separate rudder projects below each wing. These rudders can be moved either together or separately and can form air-brakes when desired. There is only one control wire to each rudder, which pulls against a rubber cord, the latter tending to make the rudder return to the normal position.

The landing gear consists of two wheels forward and a third wheel aft. The wheel base of the landing gear is necessarily very short.

Two seats are provided, but only one was occupied during the flight at the display.

Conversation with the pilot developed the fact that the airplane has a strong tendency to "hunt"; that is to say, to pursue an undulating course. The lateral control, however, is said to be very satisfactory, and this was proved by the startling manner in which the pilot scraped the grass with one wing tip when turning. While this airplane owes something to the Dunne airplane, it has a great many original points.

Vickers "Vendace" (Rolls-Royce 270-horsepower "Falcon III" engine)

These two 2-seated airplanes have been produced for training pilots for deck-landing work, the *Sprat* being actually shown with the landing hooks in place on the axle. They can be converted into

training twin-float seaplanes. Both have folding wings so as to be easily accommodated on shipboard.

Gloucestershire "Gorcock" (Napier 525-horsepower "Lion VIII" engine)

This is one of the four new single-seated fighters at the display and is equipped with one of the new direct driven "Lion" engines. It is very similar in outline to all the Gloucestershire productions. Cooling is by a large semiconical radiator of considerable head resistance mounted below the fuselage.

Hawker "Hornbill" (Rolls-Royce 700-horsepower "Condor IV" engine)

This is the second of the new single-seated fighters and is the first airplane to be equipped with a direct-driven "Condor." Notwithstanding the size of the engine, entailing considerable weight and wing area, the airplane in flight proved very maneuverable and has an astonishing climb. It has only one gun fitted in a tunnel on the left side of the fuselage. Further information on this airplane will be found in the description of the Hawker factory.

Avro "Avenger" (Napier 525-horsepower "Lion VIII" engine)

This is the third of the new single-seated fighters and is equipped with the direct-driven Napier "Lion." The wings used on the airplane at the display were loaded to 10½ pounds per square foot, and the top speed was about 178 miles per hour. Another set of wings, somewhat smaller and having a loading of 12½ pounds per square foot is to be fitted to the *Avenger*, which it is hoped will then give a speed of about 183 miles per hour. The present unsuitable propeller is also to be replaced when a better one is found.

The *Avenger* has two Lamblin straight-blade radiators fitted under the top wing.

Fairey "Firefly" (Curtiss 430-horsepower D–12 engine)

This is the fourth of the new single-seated fighters. It is naturally very similar to the *Fox* on a smaller scale. The whole design is remarkably clean, the engine in particular being better faired into the fuselage than that of the *Fox*. Apparently this has been obtained by slightly lowering the engine bearers. The Oleo landing gear is also beautifully stream lined.

Fairey-wing radiators are placed in the center section and in the inboard portion of the left upper wing.

Two guns are provided, firing through recesses in the sides of the fuselage.

Armstrong-Whitworth "Atlas" (Armstrong Siddeley 385-horsepower "Jaguar IV" engine)

The *Atlas* is a two-seated airplane with steel fuselage and wood wings designed for army cooperation. Its total weight is 3,740 pounds, including a useful load of 1,100 pounds. Its speed at ground level is 145 miles per hour and at 10,000 feet 140 miles per hour. Its ceiling with full load is 20,000 feet and its endurance four hours. The fuselage is of steel, but the wings are of wood.

The example shown at the display was equipped with a shepherd's crook arrangement for picking up burdens when flying.

Bristol "Boarhound" (Bristol 425-horsepower "Jupiter VI" engine)

This 2-seated army cooperation airplane has ailerons (of the Frise balanced type) on the lower wing only. These ailerons do not extend to the wing tips, there being a small fixed portion of the wings at the ends. The engine has exhaust pipes running aft below the fuselage.

De Haviland "Hyena" (Armstrong-Siddeley 385-horsepower "Jaguar IV" engine)

The *Hyena*, also designed for army cooperation, is a direct descendant of the DH–9A.

Further information on this airplane will be found under the heading "De Haviland Aircraft Co. (Ltd.)."

Vickers "Vespa" (Bristol 425-horsepower "Jupiter VI" engine)

In this army cooperation airplane the fuselage is placed midway between the lower and upper wings. The wing area is fairly large for the purpose of obtaining a slow landing speed.

Fairey "Fox" (Curtiss 430-horsepower D–12 engine)

The example shown of this famous airplane was the original prototype equipped as a day bomber. The *Fox* is described under the heading "Fairey Aviation Co. (Ltd.)."

Hawker "Horsley" (Rolls-Royce 670-horsepower "Condor III" engine)

This airplane will be the standard day bomber of the Royal Air Force, and is described under the heading "Hawker Engineering Co. (Ltd.)."

Avro "Ava" (two Rolls-Royce 670-horsepower "Condor III" engines)

This is a remarkable night bomber and coastal torpedo airplane. It appears to be a splendid airplane and handles remarkably well, especially when taking into consideration its great size. It can carry two 18-inch or one 21-inch 3,700-pound torpedo or an alterna-

tive bomb load. The biplane tail has two rudders and a single elevator with two small wings above for balancing purposes. Below the fuselage under the rear cockpit there is a hammock-like seat hinged at the forward end, the rear end being lowered by cables. In the lowered position the pilot can sit on this seat with his feet on a fixed trapeze and can thoroughly protect the rear of the airplane from attack from below.

Armstrong-Whitworth "Argosy" (three Armstrong-Siddeley 385-horsepower "Jaguar IV" engines)

This very large airplane has been designed for Imperial Airways. It accommodates 20 passengers in the cabin in addition to the crew of two. The cabin is 29 feet long, 4 feet 6 inches wide, 6 feet 3 inches high, and there are luggage compartments in front and behind the cabin.

It is stated that this airplane can be flown with full load with any two of the engines at 2,000 feet altitude without losing height.

The fuselage is of steel tubing and the wings are of wood. The landing gear is of the 2-wheel type supported by Oleo shock absorbers and steel springs.

There is a tail adjustment gear which enables the airplane to be trimmed at different speeds and for different loadings.

Cierva "Autogiro" (130-horsepower Clerget engine)

The *Autogiro* shown at the display was a reproduction of the last example built in Spain, but constructed by the Avro Co.

The diameter of the 4-bladed air screw is 36 feet and the average chord of the blade is 2 feet 7 inches. As the area of each blade is 40 square feet, the total lifting surface is 160 square feet. The blades are of Göttingen 429-wing section.

The top speed of the *Autogiro* is 68 miles per hour, not very much slower than an Avro 504 fitted with the same engine. The landing speed is about 10 miles per hour. The lifting capacity of the blades may be realized when it is stated that at 140 revolutions per minute the tips of the blades are moving at 180 miles per hour. The Air Ministry has several further "autogiros" on order of various horsepowers up to 400.

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5. *Royal aircraft establishment, Farnborough.*

POWER-PLANT SECTION

I was shown an engine designed by Ricardo and built at the Royal Aircraft Establishment, which consists of a large horizontal cylinder having two pistons and two cranks. It can be used either with sleeve or poppet valves and as a one, two, or four stroke engine.

The altitude chamber has been used for testing the Royal Aircraft Establishment supercharger mounted on a Liberty engine. The chamber has not been inclosed, due to fear of a repetition of the accident at the Bureau of Standards in Washington, but the pumps are used to cause a depression in the inlet pipes and the air taken into the carburetor is cooled.

A supercharger Napier engine is on a test bed to try out a blow-back valve designed to prevent backfires in the carburetor. The supercharger developed at the Rolls-Royce factory for a "Condor" geared engine has been sent back to the factory, due to trouble with the bearings.

The Royal Aircraft Establishment are making for the Bristol Co. the cylinders of a new air-cooled radial engine known as the "Mercury." The cylinders are of a light alloy known as 25 T. B., containing magnesium. Unlike the "Jupiter" cylinders, the new cylinder has a screwed-on head. The "Mercury" engine has been designed primarily for single-seated fighters and has 6 inches less diameter than the "Jupiter." Some of this reduction in diameter has been gained by shortening the stroke by 1 inch, the dimensions of the "Mercury" cylinders being 5¾ by 6½ inches bore and stroke. The horsepower developed is 520 at 2,000 revolutions per minute. A feature of the "Mercury" engine is the stamped dropped forged duralumin crank case brought out originally for the "Jupiter VI."

I saw the Bristol *Bloodhound* with "Jupiter" supercharged engine. The ceiling of this airplane has been raised from 20,000 to 30,000 feet by using this supercharger. The supercharger is of the Royal Aircraft Establishment type and is placed behind the engine and below the crankshaft. There is no by-pass for the exhaust gases and the turbine runs all the time that the engine is running. The helical passages for the gas distribution have been suppressed and now the intake pipes are connected to a circular manifold attached to the back of the cylinders. There are two Claudel Hobson carburetors.

The Bristol Co. are developing an engine called the "Orion," with a supercharger driven by a planetary gear. The flexible drive is obtained by means of a spring connection including a slipping clutch. The company is also working on a 12-cylinder fixed V-type air-cooled engine for the Air Ministry designed to develop 650 horsepower. This engine will have single sleeve valves built under the Burt McCollum patents and similar to these used in the Argyll motor-car engine. The designer of the Bristol Co. firmly believes that poppet valves must eventually be suppressed on aero engines, as these are one of the few remaining causes of trouble.

Various.—I was allowed to examine the Fairey *Ferret* three-seated fleet reconnaissance two-bay biplane. The *Ferret* being

designed for shipboard work, is equipped with flaps as well as ailerons.

This airplane is at the Royal Aircraft Establishment in connection with catapult trials. The particular example at Farnborough has a land chassis the axle of which has fittings for the catapult gear. A removable fairing with a cushion holds the pilot's head in place. The "Jaguar" engine has a hand-starting gear on the right side of the fuselage.

It may be mentioned that the British are experimenting with two types of catapults. One designed by a Mr. Cary employs cables operated by compressed air. The other of Royal Aircraft Establishment design is of the ram type and uses an explosive. At present the catapults are only in the experimental stage, and the airplanes tested with them do not take the air, merely running along the ground.

A Fairey *Fawn* having a Napier "Lion" engine with supercharger was noticed. Only very few of these have been constructed and appear to give bearing trouble, as the Royal Aircraft Establishment design was not closely followed. The supercharger fits very neatly in the nose of the engine and weighs 200 pounds complete, with air cooler and inlet pipe. The service ceiling of the *Fawn* is increased to 27,000 feet by the supercharger.

Another airplane with a "Jaguar" supercharged engine was noticed. In this case the supercharger is a gear-driven one with an elastic drive fitted in the crankcase. The ceiling of the airplane has been improved only by 4,000 feet and the design is considered far from final.

Electricity.—A great deal of work has been done with short-wave wireless transmission. Various kinds of aerials were noticed on airplanes for test. A Westland "Yeovil" day bomber ("Condor" engine) has been fitted with two wires running from the landing gear axle to two struts near the tail under the fuselage. This method had the disadvantage of fouling long grass on landing fields. Another airplane has an aerial running from the rear edge of the top wing to the tail fin and supported midway by a strut running up from the fuselage. This, of course, interferes with the real gunner. It appears that trailing aerials are not suited for short wave wireless.

Short-wave radio is also considered to require the screening of magnetos and winding of all cables for ignition, etc., as well as the complete bonding of all metal parts. Engine designers consider that screening reduces the reliability of the engine by at least 25 per cent.

6. De Haviland Aircraft Co. (Ltd.), Edgeware.

DH–66.—The De Haviland Co. is building 5 DH–66 commercial airplanes for Imperial Airways. This airplane has 3 "Jupiter" engines and accommodates 14 passengers in the cabin. It has a steel tube fuselage and wooden wings.

Fifty "Moth" airplanes have been built and sold, most of them to private owners, but 3 to the Irish Free State. A further set of 20 is about to be laid down. On account of the large number built, it has been possible to use jigs for the fuselage assembly.

DH–67.—The De Haviland Company is building an airplane which it is hoped will finally replace the DH–9A. This type is known as the DH–67. Its wings have duralumin spars of oval section with no lightening holes. Steel compression tubes are used in the wings. Spruce ribs are employed having birch three-ply webs.

The standard DH–9A's built by the Westland Co., weighed 400 pounds more than the original example built by the De Haviland Co., and the DH–67 represents an effort to restore the light weight and gain additional useful load by the employment of a radial engine.

Hyena.—I was shown the *Hyena* (DH–56) previously seen at the Air Force display. The *Hyena* weighs loaded 3,900 pounds and has a speed of 130 miles per hour. It has a tremendous equipment, including two sets of wireless-telegraph sending and receiving apparatus, wireless telephone, klaxon and light signaling apparatus, an 80-pound camera placed just behind the "Jaguar" engine in the bottom of the fuselage, and a shepherd's-crook arrangement for picking up burdens in flight.

The exhaust-pipe collectors are of stainless-steel tubing with holes in the sides of the pipes.

The pilot's seat is adjustable as to height, and the rudder bar can also be adjusted. The pilot operates a half-inch gun, and there is another gun placed on a ring mount for the observer.

On account of the short-wave wireless, all metal parts are bonded, including every nut to its bolt, actual contact not being considered sufficient.

The *Hyena* supersedes the *Dormouse*, as the Air Ministry has changed its specifications for this type.

Various.—A DH–37 equipped with an A. D. C. "Nimbus" engine instead of a "Falcon" was being prepared for the King's cup, as well as several "Moth" biplanes. The "Moth" for Captain De Haviland has a "Cirrus" Mark II engine giving 80 horsepower instead of 65 horsepower.

The *Highclere* (DH–54) owned by the Air Ministry will not be used by Imperial Airways, as the latter has adopted the policy of three engines for new airplanes. This is unfortunate, as the *Highclere* is very comfortable and comparatively quiet, owing to the good muffling of the "Condor" engine. Three radial engines are bound to be noisy even when equipped with silencers, due to valve clatter.

It was especially noted that De Haviland automatic flaps have not been used in the new DH–66. While these flaps lower the landing speed by about 6 miles per hour, they incur a certain amount of additional weight and are considered hardly worth while if ordinary airdromes only are used. The whole subject is being investigated by the comparative performances of two Bristol "Fighters," one standard and the other arranged with flaps.

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7. Fairey Aviation Co., Hayes.

The number of workmen at the Fairey plant varies between 1,200 and 2,000, depending upon the work in hand at the moment.

Fox.—The order for 18 "Fox" airplanes is now almost complete, and it is not expected that a further order for this type will be received until reports have come in from the squadron which will use them.

The airplanes under construction are equipped as day bombers and not merely as 2-seated fighters. Each airplane can carry two 230-pound bombs of four 112-pound bombs.

A Pyrene fire extinguisher operated by the pilot is connected by pipes to the carburetors of the Curtiss D–12 engine. Cooling is by a wing radiator of Fairey design and construction placed in the center section of the upper wing and also by a retractable honeycomb radiator under the fuselage and controlled by worm and cable gear.

The "Fox" shown at the display was the original one, having landing gear legs with more clumsy stream lining than is now the practice. In the current examples shock absorbing is by means of tubes containing rubber balls instead of disks.

The fuselage is of steel-welded tube construction from the nose to the rear cockpit, the after part of the fuselage being of wood attached to the steel portion by fish plates. The equipment includes both camera and wireless.

No gun ring is supplied for the rear cockpit as the wind resistance would be too great for its operation. The gunner has a vertical swivel post projecting about 4 inches above the cockpit and folding down inside the fuselage when out of use.

Various.—A large number of Fairey "Flycatchers" are still being built. The "Jaguar" engine of these airplanes is now equipped with an exhaust collector and two pierced pipes for night-flying purposes.

I was shown an experimental single-seated pursuit airplane ordered by the Air Ministry. This airplane is a step in advance of the "Fox" and "Firefly" as the fuselage is entirely of welded-steel tubing. The center section of the upper wing is of steel, the rest of the wing being of wood. The engine will probably be a supercharged "Jaguar."

The Fairey Co. has built only one example of the new type of Reed propeller with solid hub. The latest propellers are using the American S–25 alloy instead of Vickers duralumin.

The rights for the Reed propeller for Italy have been acquired by Caproni, but the Fairey Co. has built the propellers for the Dornier seaplane with two Isotta Fraschïni "Asso" engines which De Pinedo will use on his forthcoming flight around the world.

A certain number of duralumin floats are being built for the Fairey III–F seaplanes, and duralumin is also used for fuel tanks.

A set of metal wings is being made for a special III–F seaplane. The steel wave section spars are drawn at the Fairey plant in accordance with Armstrong-Whitworth and Boulton & Paul practice.

Some wooden floats are being built for the "Flycatcher" and "Ferret" amphibians. The wheels mounted within the floats project slightly below the lower surface and are preceded by flexible streamlining. The wheels are easily removable, as they are held in place by a locking ring, the upper half of which can be hinged back allowing the wheel to be drawn up through a panel in the top of the float.

A Froude engine test bed of the latest design has been installed primarily for the testing of the Curtiss engines fitted with the "Fox" and "Firefly" airplanes.

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8. *Handley Page (Ltd.), Cricklewood.*

Harrow.—I was given a glimpse of the "Harrow" torpedo-carrier, several of which are being built for the Admiralty in the greatest secrecy.

This airplane is an improved edition of the *Hendon* and has a much neater fuselage and a well stream-lined nose with radiator below the body.

There are only two pairs of interplane struts on each side of the fuselage, the diagonal struts having been suppressed. It has an R. A. F. 15-wing section, giving a much higher speed than that ob-

tained with the *Hendon*. The first example has shown a top speed of 130 miles per hour and a landing speed of 40 miles per hour, carrying 14 pounds per square foot. This airplane has recently undergone very successful deck-landing tests on H. M. S. *Furious* with full load.

The factory does not appear to be very busy, although the small contract for "Hyderabad" night bombers drags on, and a few "Hampstead" 3-engine commercial airplanes are being produced for Imperial airways.

Hendon.—I was invited to witness a demonstration of the *Hendon* 2-seated torpedo plane equipped with slots, flown by the Handley Page pilot, with a loading of about 10 pounds per square foot. The performance was quite spectacular. The *Hendon* got off the ground at once against a slight wind and landed with a very short run. The pilot was able to make some absolutely flat turns. Flying at a very high angle of incidence, the only indication that the airplane was near stalling was a pendulumlike roll. The pilot stated that this roll could be corrected far better with a stick aileron control than with the present wheel arrangement.

The *Hendon* has thin sheet duralumin airfoils along the entire loading edge. The portions of these airfoils in front of the slotted ailerons, and of somewhat less span than the ailerons, are now kept in a half-open position when in normal flight, opening to the full when the ailerons are depressed and closing when the ailerons are raised. This arrangement has the disadvantage of increasing the resistance in normal flight, but it eliminates the cam gear necessitated in the Avro type control as used by the Royal Aircraft Establishment. The inboard airfoils move in conjunction with slotted flaps by a special control. Five pivots support each inboard airfoil and three each outer section. The wings have a considerable sweep back and the rear portion of the center section of the upper wing is cut forward to the rear spar to improve visibility. The present arrangement in the *Hendon* by which the airfoils in front of the ailerons are permanently fixed half open in normal flight gives a lighter aileron control than the previous system. It has also been found that a neutral setting of ailerons 4° down is the best, being distinctly preferable to a 10° setting.

Mr. Handley Page is about to begin experiments with "interceptors" to be used in conjunction with slots and flaps. The "interceptors" consist of strips hinged along the forward edge and set on top of the top wing just behind the front spar. When these strips are raised the lift is reduced and the drag increased. It will be observed that these "interceptors" are practically identical with the American "spoiler" gear.

9. Hawker Engineering Co. (Ltd.), Kingston-on-Thames.

Horsley.—The Hawker plant is busy building a series of 40 "Horsley" day bombers ("Condor" engine). The *Horsley* won the recent competition for this type of airplane, having a distinctly better performance than the Westland *Yeovil* and Bristol *Berkeley*, the latter being considerably overweight. The Handley Page *Handcross* has a performance equal, if not superior, to that of the *Horsley*, but the latter was chosen by Air Marshal Trenchard on account of its simple and straightforward construction.

The *Horsley* has an exceedingly complete equipment, including two sets of wireless for sending and receiving. Although there is one-half mile of electric cable in each machine, it is very neatly arranged in wood containers pierced with lightening holes. Unit construction is used wherever possible, the whole assembly of certain portions such as the internal arrangements of the cockpit, etc., being placed in position at once.

The crew consists of two men. For bombing purposes the second man takes up a prone position under and forward of the pilot's seat. The bomber has a fine adjustment rudder control for his left hand in order to get the airplane on the exact course when releasing the bombs. One 500-pound bomb can be carried under the fuselage, or four 112-pound bombs under the wing roots.

There is one gun firing forward for the pilot and another in the rear mounted on the new type Vickers gun ring having two compression springs (one inside the other) with toggles and two rings mounted eccentrically. This ring is designed so as to be easily turned in the air blast.

The landing gear is very simple, there being one wheel under each wing root. Shock absorbing is by means of Oleo and rubber rings in compression. The tail skid has a cast-iron shoe riveted on a duralumin spoon.

The square section fuselage is of steel tubing to a point behind the rear cockpit. The rear half of the fuselage is of wood fastened to the steel portion by fish plates.

Stream-line wires are used not only as fuselage bracing but also inside the wings. This wiring is used merely because it is made at the Hawker works.

The interplane struts are of Accles & Pollock 17-gauge tempered steel tubing having wood fairing attached to the tubes by straps.

The spruce wing spars have three-ply sides forming a box section. The forward portion of the wing from the leading edge to the front spar is covered by three ply, the wing ribs starting behind the forward spar.

The engine is a geared "Condor" with 5.3 compression under which is the rectangular honeycomb radiator.

The *Horsley* weighs 7,840 pounds fully loaded and has a speed of 109 miles per hour at 10,000 feet and 100 miles per hour at 19,000 feet. The fuel supply consists of 240 Imperial gallons of gasoline contained in two tinned steel tanks in the center section of the top wing.

Hornbill.—I was informed that the *Hornbill* pursuit airplane originally had one of the new 800-horsepower direct-driven "Condor" engines with a compression ratio of 6.2. This engine gave so much trouble that it was changed to a 700-horsepower low-compression type with no sacrifice in performance.

The Fairey-Reed metal propeller had so much tip flutter that it has been replaced by a wooden one. There were originally two semicircular Serck radiators under the lower wing, but one has now been removed and the other placed under the fuselage.

The *Hornbill* was designed especially to intercept bombing airplanes between the coast and London. It is claimed that at ground level the top speed is 186 miles per hour and that when climbing it has a forward speed of 150 miles per hour. The climb to 20,000 feet is stated to be made in about 11 minutes. The total weight loaded is 3,730 pounds.

Hedgehog.—I was shown the *Hedgehog*, three-seated fleet reconnaisance deck-landing airplane, which is back at the factory having a number of changes made to it. Among these changes are the replacing of the Mark IV "Jupiter" by a Mark VI with variable timing. The *Hedgehog* is of the same class as the Fairey *Ferret* and the Blackburn *Airedale.*

I noticed two very heavy floats built by the Supermarine Co., of Consuta, with wheels let into the floats so as to convert the *Hedgehog* into an amphibian. As in the Fairey designs, each wheel is preceded by stream lining and there are also two deck-landing hooks at the step. The total weight of the *Hedgehog* is in the neighborhood of 5,000 pounds.

Various.—The Hawker Co. have built three airplanes called the "Danecock," for Denmark, equipped with "Jaguar" engines. These airplanes have a 12 per cent better performance than the very similar "Woodcock," with the same power plant. Twelve "Danecocks" are now being built for the Danish Admiralty at the Copenhagen Navy Yard under license.

I was informed that the Hawker *Heron* as at present constructed has a speed of 155 miles per hour at ground level and 140 miles per hour at 20,000 feet. This performance is expected to be considerably exceeded by the *Heron II*, which will have a supercharged "Jaguar" engine.

A wing of a "Woodcock" airplane was noticed having slotted leading edge airfoils in front of the ailerons.

It is understood that the directors of the Hawker Co. do not intend to increase the size of the present plant. If the work becomes too heavy to be handled by the present organization, some of it will be turned over to subcontractors.

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10. Vickers (Ltd.), Weybridge.

The Vickers Co. have about 1,000 men now working at Weybridge, and the factory is again being considerably enlarged.

Wibault.—A series of 26 Wibault high-wing pursuit monoplanes are being built for Chile under French license. The construction is interesting, the airplane being entirely of metal, including the aluminum wing covering. The spars are of the box type with channel side pieces riveted externally to the top and bottom flanges. The ribs form bulkheads riveted to the wing covering strips which are rolled with grooves. The general wing construction shows strong Dornier influence. It may be noted in this connection that the latest Dornier airplanes have reverted to fabric for wing covering.

The square section fuselage is a very simple structure of angles for the longerons and diagonal braces and tees for the transverses. The engine bed attached by four bolts to the fuselage carries the latest "Jupiter VI" with variable cam gear.

The wing section is of the distinctly high-lift type with deep camber. The wing is reduced in thickness at the center and at the tips. The ailerons extend from the fuselage to the wing tips.

The axeless undercarriage is of Vickers design. As seen from the front elevation, it consists of an X with the ends of the struts connected together from top to bottom by other struts carrying the Oleo gear. By a system of joints at the intersection of the X struts and at their connection with the fuselage, rotation as well as swiveling is allowed.

Vixen.—I saw a new type Vickers *Vixen* two-seated fighter fitted with a geared "Condor" engine instead of the usual "Lion" engine. This airplane is a private venture of Vickers, not being made to an air ministry order. It has a speed of 162 miles per hour at 20,000 feet, and carries a considerably greater military load than the standard *Vixen*. The wing area is, of course, also increased.

The semiconical shuttered radiator under the fuselage is being increased in area as the engine overheats; also a suitable propeller has yet to be found for this airplane.

Pursuit biplane.—Vickers have under construction a pursuit biplane with Hispano-Suiza 450-horsepower V type engine (developing about 600 horsepower). They are using their own method of metal construction which includes wings with duralumin tube ribs having plates for fastening to the steel spars. The wing section

resembles that of the *Wibault*. The upper wing is heavily staggered forward and the visibility appears to be very good.

Victoria.—I saw 12 "Victoria" Mark III troop carriers being assembled for use in Iraq. Each of these is equipped with two Napier "Lion" engines, as the "Condor" engines intended for these airplanes overheat. The cabin accommodates 24 men with equipment. The nose is a two-ply semisphere laid on forms, as is the case with the *Nieuport 29*. The diagonally arranged strips are tacked temporarily while the glue hardens. The throttle control for both engines is combined in one neat lever by means of a device using two bevel gears. The lever is universally jointed so that the engine speeds can be adjusted in relation to each other.

ITALY

A. AERONAUTICAL

1. Officer applicants for aviation service.

The following regulations concerning naval officers who wish to be assigned to aviation were published in general orders August 26, 1926:

The organization of the Ministry of Aeronautics requires that by the year 1927 the number of naval officers assigned to aviation shall be increased by 35 line officers, seaplane observers; 3 lieutenants, seaplane pilots.

In November special training courses for officers who desire to obtain the brevet of observer or pilot will be inaugurated.

The following officers may apply for the observer courses:

(*a*) Lieutenants of the regular service and lieutenants (junior grade) who have already passed the advanced course at the naval academy.

(*b*) Officers "di complemento" who are serving for three years in addition to their regular conscription period.

The following officers may apply for the pilot courses:

(*a*) Lieutenants of the regular establishment with commission prior to December 1, 1924. They must bind themselves to serve as pilots for at least three years.

NOTE.—At present there are in the navy 37 observers, no pilots, 7 student pilots.

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2. Training activities.

[Source: M. I. D.]

The second training period of the Italian Navy took place August 26–28, and the third period September 1 and 2.

The following are the subjects of the second and third training periods:

Second period.—Hostilities are opened in the Mediterranean, and the enemy (Red group) has succeeded in occupying Cagliari and

Maddalena (south and north of Sardinia). From there the enemy forces have navigated toward Naples and, after having bombarded the city, are returning to Sardinia. The National Forces (Blue group) have been informed of the bombardment of the city and move to the attack. On account of their greater speed they meet the Red group in the vicinity of the islands of Capri and Ischia (Gulf of Naples). However, the two groups are within firing range only after sunset, and the darkness prevents any tactical operation. Only destroyers and light craft have a possibility of attacking.

The maneuver is consequently based chiefly upon results of operations of submarines, destroyers, flotilla leaders, darkness making it possible for them to attempt to torpedo the larger units.

The Blue group includes *Gialio Cesare*, *Cavour* (dreadnoughts); *Ancona*, *Brindisi*, *Venezia*, *Quarto* (light cruisers); second and third destroyer flotillas, submarines, and two seaplane squadrons.

The Red group includes *Doria*, *Duillie* (dreadnoughts); *Marsala*, *Bixie*, *Pentera*, *Leone*, *Tigre* (light cruisers); one destroyer flotilla, submarines, and seaplane squadrons.

Third period.—The preliminary phase of the maneuvers being the same, the Red group is discovered, after the bombardment of Naples and while navigating toward Sardinia, in daytime, by seaplanes and light cruisers, 20 miles south of Capri. For this third training period the groups are as in the second training period.

Pursuit and observation seaplanes (*Macchi 7* and *18*, folding-wing types) carried on board the dreadnoughts and light cruisers took part in the action. Catapults proved efficient and reliable.

In view of the fact that no press correspondents were invited to witness the maneuvers, details are lacking. However, it has been possible to find out that in the second training period (August 26–28) seaplanes failed on account of darkness to discover the Red group, which was navigating toward Sardinia and which was attacked by light cruisers during the night. At dawn it was ascertained that the number of units attacked and destroyed during battle, both in the Red and in the Blue group, was more or less equal, and that no group succeeded in securing mastery.

In the third training period (September 1 and 2) the seaplane squadrons of the Blue group succeeded in discovering and sinking four submarines laying in wait around Capri. The squadrons of the Red group, stationed in Sardinia, were also very active, as they discovered, bombarded, and sunk units of the Blue group.

The third training period is considered the most important and that which has given best results in the study of employment of seaplane squadrons. The Red group succeeded in cutting the retreat of the Blue forces, and secured victory. No torpedo planes have been used in these maneuvers.

3. Notes on aeronautical equipment.

Italy has no airplane carriers, nor none under construction. They have carried out limited experiments with flotation gear for land planes flying over water. However, emergency flotation gear is not considered of great importance, and this is fitted to a few experimental planes only and is not a service equipment.

The usual flotation gear used is an air bag under the inboard end of each lower wing and one on the after part of the fuselage. It is not considered necessary to release the landing gear before landing on the water when the plane is equipped with planing boards on axle and with a tail skid; these latter, however, are considered necessary. The water-tight fuselage is not considered better than inflatable bags. It is considered necessary to float the plane in a normal attitude, and this is accomplished by the planing boards to prevent capsizing upon landing and by the three air bags to hold the plane upright after alighting.

The Italians have had no experience with water-tight wings or with evacuating fuel tanks. They consider life preservers necessary for flying personnel. They have no definite opinion in regard to amphibians because of their limited experience; however, two of these planes are now being tested.

JAPAN

A. NAVAL

1. Visit of Japanese training squadron to Italy.

The Japanese training ships *Yakuma* and *Adzuma* arrived at Naples on September 22, 1926. On these ships are the Japanese Imperial Princess Hagimaro Yamashima and Hirovishi Fushini, who are traveling incognito.

One hundred and thirty midshipmen, escorted by officers, arrived in Rome on September 23. Admiral Yamomoto commanding the division and the commanding officers of the two ships arrived later in the day and were received by the Italian authorities and the Japanese naval attaché. Wreaths were laid by the midshipmen on the tomb of the unknown soldier. After this ceremony they paraded down the Corso Umberto passing the Palazzo Chigi, Sig. Mussolini's office. Sig. Mussolini and the Italian naval authorities watched them march by. They left Rome in the evening. Admiral Yamomoto and other officers were invited to dinner by the Undersecretary of State for the Marine, Admiral Sirianni.

NOTE.—The *Yakuma* and *Adzuma*, used for training purposes, are old battleships of about 9,500 tons, built in 1899, and now designated as "Coast defense vessels."—Ed.

2. *New Japanese cruisers.*

[Source: English press]

The launch of the Japanese cruiser *Aoba* indicates that the rate of progress of these post-Washington ships is less rapid than that of their predecessors. The *Aoba* is the third of the group of four 7,100-ton cruisers ordered after the Washington conference, two of which were laid down in 1922 and two in 1924. The first ships, the *Furutaka* and *Kako*, have reached the trial stage this year, and the second pair, as the *Aoba's* launch shows, are only now taking the water. The 5,500-ton vessels which preceded them were built and completed in two years or less. Their armament, however, consisted of 5.5-inch guns, and it may be that the advance to 8-inch guns in the new ships coupled with the increased displacement has retarded the rate of construction.

After the 7,100-ton cruisers come four of 10,000 tons, none of which has yet so far as is known been launched. Two were begun in 1924 and two in 1925. The most advanced of them, the *Nachi*, was seriously damaged early this year by the collapse of two cranes and will have to be extensively reconstructed.

NOTE.—The *Aoba* was launched at Mitsubisbi yard on September 24. She is of 7,100 tons, with a speed of 33 knots, and mounts six 8-inch 50-caliber C. L. guns in three turrets, and 12 above-water torpedo tubes.—Ed.

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3. *Destroyers Nos. 23 and 25.*

Destroyer *No. 25* was commissioned on September 15, 1926, and the following officers were assigned to her:

Rank.	Duty.
Commander	Commanding officer.
Lieutenant	Torpedo officer.
Lieutenant	Gunnery officer.
Lieutenant	Navigator.
Lieutenant (junior grade)	Ordered on board.
Lieutenant (eng.)	Chief engineer.
Ensign (eng.)	Ordered on board.

Destroyer *No. 23* was completed at the Uraga Dock Works on August 28. She will be assigned to the Thirtieth Destroyer Division.

NOTE.—These two boats are identical, being 1,445 tons, developing 34 knots at 39,000 horsepower, and mounting four 4.7-inch C. L. guns and six 21-inch torpedo tubes.—Ed.

4. Engine trouble with submarines I–1 and I–2.

According to the Japanese press, submarine *I–2*, while proceeding from Kure to Senzaki Bay on August 30, developed engine trouble, forcing her to fall out from her division and proceed back to Kure for repairs, which it is estimated will take one week.

Submarine *I–1* developed engine trouble on August 17 and is undergoing repairs to engines.

NOTE.—*I–1* and *I–2* are sister boats, of 1,970/2,400 tons, speed of 20/? knots developing 1,800 horsepower submerged, mounting two 4.7-inch guns and six 21-inch torpedo tubes, and having a cruising radius of 8,000 to 9,000 miles at 13 knots.—Ed.

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5. Submerged cruise of Japanese submarines.

According to the Japanese press, the sixth submarine division (Ro. 57, 58, 59) left Maidzuru on September 9 in company formation and arrived at Seishin, Korea, on September 11, making a submerged cruise from Maidzuru to Seishin in 44 hours.

NOTE.—These boats are of 900/1,090 tons, with speeds of 17.5/10.5 knots.—Ed.

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6. Radio communication between submerged submarine and airplane.

According to the Japanese press, one of the training submarines attached to the Submarine School, Kure, while submerged at a depth of 30 feet successfully carried on radio communication with an airplane at a height of 1,000 feet.

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7. Gas masks.

On account of the importance aircraft will play in future warfare, special attention is being paid by the Japanese Navy to protect ships from poison-gas bombs discharged by airplanes, and it has been decided to equip all ships with gas masks.

B. AERONAUTICAL

1. Dirigible No. 5, "No. 1 type," completed.

According to the Japanese press, dirigible *No. 5*, "No. 1 type," which has been under construction at the Fujikura Industrial Co., was completed and was sent by rail to Kasumigaura Naval Aviation Station on September 11, 1926.

Dirigible *No. 5* is to replace *No. 4*, which met with an accident on June 22 and has been placed out of commission.

2. *Plane for submarines.*

Using the *Heinkel* seaplane as a model the Yokosuka Navy Yard is building a Heinkel-type plane with a 70-horsepower Lorraine engine for use on submarines. This planes is intended for use on submarines of the *I 1* class. The machine can be assembled in 16 minutes by two men and has a span of about 16 feet.

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3. *Model for bombers.*

[Source: M. I. D.]

The army is now carrying on experiments and tests preparatory to adopting a model for day bombers and night bombers.

At present a test is being conducted for day bombers between the *Breguet 19* (Lorraine 450) and the *Fokker* (Napier 450). It is not yet known which of these two models will be adopted, but the matter will be definitely settled in October.

With reference to the *Breguet 19*, it is to be noted that Nakajima has the license for the manufacture of both plane and engine. With reference to the *Fokker*, the question is not so clear. Mitsubishi first introduced the *Fokker* into this competition, but it is now believed that the Tokyo Gas Denki has a license for its manufacture. The Napier engine is not manufactured in Japan.

With reference to night bombers, extensive tests are now going on with the *Kawasaki Dornier* (two Napier 450). This particular plane is a land plane, closely resembling the *Dornier-Wal*. It is probable that this plane will be engined by two B. M. W. 550-horsepower motors which is now undergoing test in Germany. It seems very probable that this plane will be adopted for night bombing.

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4. *Airplane engine by the Mitsubishi Co.*

[Source: Japanese press]

Some time ago the Mitsubishi Nainenki Kabushiki Kaisha at Nagoya designed and produced a high-power (470) motor of all Japanese construction as a result of many years' work on the part of its experts, Mr. Katayama and Mr. Oyobino. The engine was subjected to a 50-hour performance test at the works, and it was found that it developed a maximum of 513 horsepower, with a gasoline consumption for the entire test of only 220 grams. It was styled the "Mitsubishi engine."

However, as the design and manufacture of this engine called for utilization of purely Japanese products, the cost of production was very high. Recently this company has secured the right to build in

Japan 450-horsepower Hispano-Suiza engines. As this latter engine can be made more profitably than the Mitsubishi engine, the Mitsubishi Co. has abandoned the manufacture of Mitsubishi engine in favor of the manufacture of Hispano-Suiza engine.

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5. *Long-distance flights.*

[July 21 to August 25, 1926]

a. NAVAL—KASUMIGAURA–MIYAKEJIMA

Nature: Two-way formation flight.
Distance: Total 244 sea miles.
Craft: Five 1921 ship reconnaissance machines.
Date: July 23.
Results: Fine. A high-sea formation flight of five ship machines had never been made before.

b. NAVAL—HIRO–SASEBO

Nature: Night flight without prearrangements; two way.
Course: Hiro–Hirado–Sasebo, and reverse.
Date: Forward, July 21; backward, July 22.
Results: An uncommon success, though one of the machines made a forced landing on water not far from Sasebo owing to lack of fuel.

c. NAVAL—YOKOSUKA–KOREA FLIGHT

Distance: One thousand eight hundred and two sea miles, both ways taken together.
Course: Forward, Yokosuka–Maizuru–Gensan (Korea): then Gensan–Joshin; backward, Joshin Maizuru: then Maizuru–Yokosuka.
Craft: Two F–5 flying boats.
Pilot: Lieutenant in each case.
Date: July 25–31.
Results: Very good, covering successully the Maizuru–Gensan and Joshin–Maizuru laps, which ran over the Sea of Japan 300 sea miles in the case of the former and 466 in the case of the latter. Forced landing occurred three times owing to weather conditions.

d. NAVAL—KASUMIGAURA–OITA NONSTOP FLIGHT

Purpose: To join in the combined fleet's practice had in the Bungo Channel and then in the bombing of the abolished Hiroshima Bay Fortress.

Distance: Four hundred and seventy miles.

Craft: Three 1924 Ship's attach machines of the Kasumigaura naval air group.

Date: Forward, August 8; backward, August 17.

Crew: Pilot, lieutenant, first lieutenant, or petty officer; passenger, first lieutenant or petty officer.

Results: Good, though one or two forced landings occurred on the forward trip.

e. ARMY—AKENO–TOKOROZAWA NONSTOP FLIGHT

Purpose: To return from the aerial firing practice started on July 15 and ended on July 30.

Craft: Four B–1 reconnaissance machines of the Tokorozawa Army Flying School.

Date: July 31.

Results: Very good, flying in formation. One of the machines carried the commandant of the school (Lieutenant General Uehara).

f. ARMY—HIROSHIMA–TACHIKAWA FLIGHT

Purpose: To return from the practice of bombing the abolished Hiroshima Bay Fortress.

Craft: Three machines of the seventh air regiment now provisionally at Tachikawa, two D–2 bombers and one B–1 reconnaissance machine (the latter having engaged in observing the bombing).

Crew: Bomber, pilot, captain or lieutenant; passengers, three (officer, noncommissioned officer, and man).

Reconnaissance machine: Pilot, sergeant; passenger, chief artificer.

Date: August 24.

Results: One of the bombers made a forced landing in thick fog between Mount Fuji and the Hakone Mountains; it was smashed, though the crew were uninjured. The other fell in the Tanzawa Mountains in Kanagawa Prefecture, with one of the crew severely injured, wounded, and three slightly injured. Of the reconnaissance machine no news was published.

6. *Japanese Army official report of bombing of Kojima Fort.*

Japanese Army official report of bombing of Kojima Fort:

Planes used:

Army—Tei No. 2 type bombing planes	2
Navy—1924-model torpedo planes	4

Bombs used:

Army—200 kilogram and smaller bombs	24
Navy—240 kilogram and smaller bombs	20

Details of bombing:

First day, Aug. 15, 1926—
Army—4 flights, no effective hits.
Navy—3 flights, two partially effective.

Second day, Aug. 16, 1926—
Army—3 flights, no effective hits.
Navy—2 flights, one effective.

Third day, Aug. 17, 1926—
Army—not engaged.
Navy—2 flights, no effective hits.

Fourth day, Aug. 19, 1926—
Army—2 flights, no effective hits.

Fifth day, Aug. 20, 1926—
Army—2 flights, 5 hits.

Effects of bombing:

(*a*) Navy—2 bombs on first day. One hit wall of passageway, totally destroying ordnance storeroom; second bomb hit breech of gun and twisted it out of shape. One hit on second day; hit railroad track, destroying communications between magazine and gun.

(*b*) Army—5 bombs on fifth day. First bomb hit peton (?) wall and destroyed gun; second bomb hit peton (?) wall and damaged gun; third bomb peton (?) wall but failed to explode; fourth and fiifth bombs hit the beach.

COMMENTS BY THE PRESS

In view of the poor record made by the army in the bombing of Kojima Fort and in order to defend their side of the case the army issued a circular which was distributed to the various parties concerned. This circular was based on the findings of the board and was unsatisfactory to the navy inasmuch as it tends to make the showing of the army appear better than it actually was. For instance the circular states that two Tei No. 2-type army bombing planes and four 1924-model navy torpedo planes participated, when the facts of the case are that the three Tei No. 2-type, one Otsu-type army plane, and three 1924-model torpedo planes (navy) took part in the bombing.

Regarding the bombs, the circular states that the army used 24 bombs, but they actually used 66 bombs, and that the navy used 20 bombs, but only 16 were actually used.

The circular also states that the navy made two bombing flights on the third day but failed to score any effective hits, but the

planes of the navy actually finished on the second day and returned to their station.

The circular further stated that only three effective hits were scored by the navy, but the diagram plainly shows that the navy scored a total of 14 effective hits.

The army gives as an excuse that the navy has had more experience in bomb dropping. The reverse is the case. The navy started bombing practice in 1924, using a 1924 model torpedo plane. The army officers engaged in the recent practice were sent to France in 1919 and 1920, and since then have specialized in this.

In the circular, the army admit that they made no effective hits in the first five days, but in the sketch they show the sixth bomb (first day) as hitting near wire entanglements, the effective zone. On the other hand, they show the navy's ninth bomb as striking outside of effective zone.

The circular attributes the poor showing of the army to lack of training and equipment for practicing.

The younger officers of the navy are stirred up over the way the matter is being handled by the army. The minister of the navy, aware of this, held a conference of high officials of the department to determine what should be done, and while it was agreed that the navy's record was much better than expected it would be best to let it remain silent.

However, while the navy will not make any statement contradicting the army circular, it is apparent that the navy performed well. The army lays great stress on their performance of the last day, but as the navy did not participate on this day it is not fair to make comparison on that date: however, a comparison of the first two days, when both army and navy participated, would be in order. The result of the first two days is as follows:

	Bombs	Effective hits	Percentage
Army	18	0	0
Navy	16	14	88

The army used 190 officers and men: the navy 13 officers and men.

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7. *Bombing of Kojima Fort.*

[Source: M. I. D.]

The Kojima Battery of the old Hiroshima Fortress, which was abandoned on August 1, 1926, was designated to be destroyed by aircraft of the army and navy, in order to give actual practice to these services. This was the first event of this kind which has taken place

in Japan. A full and detailed account of the bombing of this battery is given below.

Two *D–2* bombing machines of the Seventh Air Regiment (now in process of formation at Tachikawa) participated for the army. Three naval-attack planes of the Kasumigaura naval group participated for the navy. The army was allowed four days and the navy two days to complete the destruction of the battery, both services working coincidentally, starting on August 15. The army and navy, each eager to achieve better results than the other, selected their best officers and men for the task.

On August 15 the army started the test. A *D–2* bomber (pilot, a captain: observers, 2 captains: bomb thrower, a captain) from Tachikawa left Hiroshima drill ground at 7.20 a. m. A *B–1* machine followed to observe the operations. The bombing machine appeared over the battery at 8 a. m. It carried four bombs. It dropped one of them immediately: then flying east and west dropped two at 8.24 a. m., followed by the last one at 8.37 a. m. No hits were made. This machine, accompanied by the observation plane, then returned to its station. Another army *D–2* bomber (pilot, a lieutenant: observers, two lieutenants: bomb thrower, a major), equipped with four bombs, then flew over the battery and discharged its bombs. One hit was made on the breastwork of the battery.

A navy 1924 attack plane (pilot, third-class petty officer; bomb thrower, a second lieutenant) then took off at 10 a. m., accompanied by an observation machine. The bombing plane dropped three bombs, two of which fell on the shore, but the third one, weighing 200 kilograms, hit the battery squarely. The machines then returned to their stations. Two other naval planes flew out at 1.35 p. m. These machines achieved two other direct hits.

On the 16th the sky was overcast with white clouds. A wind of 13 to 14 meters velocity was blowing at an altitude of 1,000 to 2,000 meters. Planes were started in succession, beginning at 7 a. m., as follows: Army *D–2* bomber (pilot, captain: bomber, lieutenant: observers, major and lieutenant): army *D–2* bomber (pilot, lieutenant: bomber, lieutenant: observers, lieutenant colonel, major, and captain); navy attack plane (pilot, sublieutenant; bomber, lieutenant); navy attack plane (pilot, lieutenant: bomber, lieutenant); navy attack plane (pilot, third-class petty officer; bomber, first-class petty officer). Each of the army planes carried four bombs, while each of the navy planes carried two bombs. One of the army machines dropped only one bomb which hit the batteries, the rest missed altogether. The other army machine experienced trouble with its bomb release and failed to discharge any bombs. The navy machines, flying in formation, dropped all their bombs simultaneously. Of

these two fell on guns in the battery, two fell on gun platforms, and two on wire entanglements 5 meters off the guns.

In the afternoon the first bomb dropped by a navy machine hit the heart of the battery and turned over a gun. A second bomb dropped by a navy machine gun again scored a direct hit. During this afternoon one army machine went out loaded with three bombs. Weather conditions were unfavorable, however, and the three bombs fell within the fortifications but not on the battery. This day completed the navy's part in the bombing.

On the 17th an army *D–2* bomber plane, flying in the teeth of a bad air current, dropped three bombs each weighing 100 kilograms. One of these bombs struck a breastwork in the battery and made a hole 2 meters deep. Another army machine dropped one bomb of 200 kilograms and one of 100 kilograms. The latter bomb destroyed some wire entanglements in rear of the battery. Further practice for this day and for the 18th was suspended on account of bad weather.

The bombing of this battery has caused much comment in the local press. In general, the work of the navy machines is praised highly, while the army is almost unanimously criticized for its poor showing.

NOTE.—A press account of this interesting practice was given in the October BULLETIN.—Ed.

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8. Air strength of Japan (October 1, 1926).

[Source: M. I. D.]

The below semiannual strength of Japanese Air Service is practically the same as that on April 1, 1926. No changes of any importance have taken place, with the exception of the completion of the *Ikagi*, which is noted under the heading in the table. There has been very little activity in airplane circles since the above date. What manufacture has been going on has been most for replacement only of broken engines or parts. No purchases of consequence of air material has been made abroad, with the exception of the navy purchase of the Italian dirigible similar to the *Norge*. This dirigible is not yet assembled.

It might be noted that the Seventh Regiment, now forming at Tachikawa, with the Fifth Regiment will move to its new station at Hamamatsu during the month of October. It is impossible to determine where the Eighth Regiment, now forming at Tachiarai, will be stationed. It has been stated that its future station will be Formosa. As the stationing of an airplane regiment in Formosa might conceivable be contrary to the provisions of the Washington treaty, this question will be closely watched.

A. Squadrons

(*a*) Present: Observation, 13; pursuit, 6; bombing, 1; others, 0; total, 20.

(*b*) Number planes per squadron: Observation, 10; pursuit, 8–12; bombing, not fixed; others, 0.

(*c*) Planned by 1930: Observation, 11; pursuit, 11; bombing, 4; others, 0; total, 26.

(*d*) Reserve: Army, none organized; navy, unknown.

(*e*) Number home, 13; number abroad, 3.

(*f*) Remarks: Eighth Regiment now forming at Tachiarai with Fourth Regiment; future station, Formosa. Seventh regiment now forming at Tachikawa with fifth regiment; future station, Hamamatzu.

B. Personnel

(*a*) Present: Officers, 550; number rated pilots, 200; number rated observers, 200. Enlisted men, 2,750; number pilots, 150; number observers, 75.

(*b*) Reserve: Officers, number organized, 0; number pilots, 0; number observers, 0. Reserves, 0. Enlisted, 0; number pilots, 0; number observers, 0.

(*c*) Navy: Officers, 600 (estimated); number pilots, 175 (estimated); number observers, unknown.

(*d*) Civil aviation: Number pilots, 187; number observers, land, 39; sea, —. Totals: Number pilots, 712; number observers, 314+.

(*e*) Civilians employed: Army, 962; naval, unknown; civil, unknown.

(*f*) Remarks: By 1930 army expects to have 300 officer pilots, 150 enlisted pilots, 225 officer observers, 125 enlisted observers.

C. Aircraft

Aircraft in storage to be considered reserve. All others "service."

(*a*) Planes.—In service: Army, 300; navy, 204; training, 155; civil, 78. Reserve: Army, 345; navy, 283; training, 48; civil, —. Experimental: Army, —; navy, 39; training, —; civil, —.

Number planes planned by army (1930), 800; navy (1931), 822 (all types).

Number planes on order: Army, —; navy, —; civil, —; foreign, —.

(*b*) Dirigibles: Army, 0; navy, 1. Balloons: Army, 3–4; navy, 6.

(*c*) Number plane hours flown (1925): Army, 17,445; navy, unknown; civil, 3,525 (1924).

D. Appropriations (Fiscal Year Begins April 1, 1927)

(*a*) Present year (United States dollars): Army, (not yet known); navy, (not yet known); civil, at 46,276,000; totals, ——.

(*b*) Last year (United States dollars): Army, 10,360,413; navy, 15,681,486; civil 335,961; total, 26,377,860. (This includes pay, subsistence, and clothing.)

Remarks: Per cent for new planes, —; per cent for research and experimentation, —.

E. Training (Pilots)

(*a*) Present rate per month, 7–10; estimated rate at end of 6 months. 50; estimated rate at end of 12 months, 75.

(*b*) Number schools: Army, 3; navy, 1; civil, 1.

(*c*) Average number of students: Army, 50; navy, 32; civil, 7–10.

F. Airplane and Engine Production

(*a*) Present rate airplanes per month, 10 (army only); present capacity, 60 (both army and navy); doubled in 9 months, tripled in 18 months (both army and navy).

(*b*) Present rate engines per month, 10-15 (army only); capacity, 60 (both army and navy); doubled in 9 months, tripled in 18 months (both army and navy).

(*c*) Number factories operating: Airplane, 10; engine, 6 (both army and navy).

G. Airplane Carriers

(*a*) Present, 3; capacity in aircraft, 115; planned by April 1, 1927, *Kaga* (80 planes).

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9. Aeronautical notes.

[Source: M. I. D.]

AERIAL TECHNICAL SERVICE BOARD

The technical service department of the army air service has been created into an independent section and has been given the name of Aerial Technical Service Board. This section consists of three departments, the department of research, supply, and administration, respectively. This new section is to control all matters pertaining to research, manufacture, supply, and general administration of arms and instruments requisite to the military aviation service. The new board is to be located at Mikatagahara instead of at Tokorozawa, at which place the technical service department has been located. It is planned to complete the removal of the offices of this board to Mikatagahara by the end of the year.

DIRIGIBLE AND BALLOON CORPS

A plan is under consideration at army air service headquarters to create an army lighter-than-air corps. It is planned to have the new organization composed of dirigibles and balloons, the officers and men for the service to undergo training at Tokorozawa before being distributed to the different stations. If this plan is consummated, an aircraft section will be created in the technical department of the army aviation headquarters at Tokorozawa.

Lieutenant Colonel Amano has been tentatively selected to be in charge of this section.

TRAINING CIVILIAN AVIATORS FOR MILITARY PURPOSES

Efforts are being made to train civilian aviators for military purposes in order to establish a pool from which reserve corps aviators may be obtained. With this end in view, the annual aero-athletic

meet, which is being held annually in Tokyo or Osaka under the auspices of the Imperial Civilian Aviation Association, will in future be performed with the military training of pilots accentuated. Likewise, the aero race, which is to be held at the Tachikawa aviation grounds for three days from November 3, will be performed with this training in view, the participating aviators being made to make emergency landings for repairs of their machines before completing a specified distance flight, or to carry to a designated place messages received by radio while in flight, or to act as scouts during night flying.

NUMBER OF CIVILIAN AVIATORS AND MACHINES

The Department of Communications under date of August 9, 1926, announced the following figures in connection with the civilian aviation in Japan:

(*a*) Civilian service planes (excepting reserve machines) number 78, of which 56 are land planes and 22 are sea planes.

(*b*) There are 226 civilian aviators, composed of 66 with first-class licenses, 60 with second-class licenses, and 100 with third-class licenses. Of these 226 aviators, 187 are pilots of land planes and 39 are pilots of sea planes.

AIR PAGEANT TO PROMOTE KNOWLEDGE OF AVIATION

An aerial pageant, in which more than 55 planes will take part, will be held over Osaka, Kobe, and Sakai on October 2 under the joint auspices of the Imperial Aviation Association, the Ministries of War, Navy, and Communications, and the Osaka Chamber of Commerce.

More than a score of army and navy planes will be detailed to take part in the maneuvers, and 35 commercial aviators have already signified their intention of taking part.

A meeting will be held the night before the pageant, at which Baron Y. Sakatani and General Nagaoka will speak, and 500,000 pamphlets will be distributed from the air to promote greater familiarity with airplanes among the common people.

AIRDROMES ON KOREAN FRONTIER

It is planned to establish, during the course of the next five years, a series of airdromes along the Korean frontiers for the purpose of strengthening the frontier defenses.

One of these airdromes will be located at New Wiju and another at Kokai, on the northern Korean border. To both of these aviation grounds air detachments from the Pingyang Air Corps will be attached.

In addition to the above stations, it is planned to create five aviation grounds along the Korean border of approximately 300 miles,

the aerodromes to be located 50 miles apart. There will also be established minor emergency landing fields along the courses of both the Tumenkiang and Yalu Rivers.

CHIEF OF AIR DEPARTMENT TO BE MADE FULL GENERAL

It is reported in the vernacular press that Lieut. Gen. I. Inouye, who was recently appointed Chief of the Army Air Department, is soon to be elevated to the rank of full general. The reason for this proposed advancement is given as a move to make the air department a more important branch of the military service by having its chief hold coordinate rank with the chief of the general staff and the directorate general of training.

ARMY AND NAVY JOINT AIR PRACTICE

The Fourth and Eighth Army Air Regiments and the Omura Naval Air Group conducted a joint maneuver with a battalion of the Forty-eighth Infantry at Saga during the month of August as a rehearsal for the special grand maneuvers to be held this fall. The Fourth Air Regiment was charged with reconnaissance and the Eighth Regiment, together with the naval air group, was charged with preventing reconnaissance of a hostile force. An engagement betwen the air force and the infantry was also included. Approximately 20 machines were engaged in this maneuver.

ARRIVAL IN JAPAN OF THE NAVY DIRIGIBLE N–3

The dirigible *N–3*, which the Japanese Navy purchased from Italy, arrived at Yokohama on board the Kokusai Kisen Kaisha steamer *Aden Maru* on August 25. The frame will be sent to the Kasumigaura naval aviation station, where it will be shortly assembled.

The dirigible is a sister ship of the *Norge*, used by Captain Amundsen in his polar flight this year. It was designed and built by Colonel Nobile. Its parts are contained in 51 packages weighing 600 tons.

It was reported a few months ago that the fabric of the ship had been burnt by explosives, but according to the captain of the *Aden Maru*, only the surface of a package was slightly damaged, and the contents are all right.

C. MILITARY

1. Defenses of the Inland Sea and the Sea of Japan.

[Source: M. I. D.]

The fortifications at Hiroshima Bay and the fortifications at Geiyo were abolished under date of August 1, 1926, and the new fortifications of Hoyo and Iki have been completed to replace them.

By the abolition of these two fortifications and the creation of the two new ones, the defenses of the Inland Sea and the Sea of Japan have been strengthened. The following is a description of the effect of these changes in the defenses of the Inland Sea and the Sea of Japan, respectively:

(1) *Reorganization of the defense of the Inland Sea.*—Until the creation of the new fortification at Hoyo, the defense of the Inland Sea was secured as follows:

(*a*) Northwestern entrance: By the Shimonoseki fortification.

(*b*) Southwestern entrance through the Bungo Straits: None. However, the passage northeastward through the Inland Sea was guarded by the Geiyo fortification and the fortifications at Hiroshima Bay. The Geiyo fortification included defenses of both towns of Aki and Iyo on opposite sides of the channel.

(*c*) Southeastern entrance: By the Yura fortification located on Awaji Island.

As now organized, the defenses at the southwestern entrance given under (*b*) above have been abolished and the Hoyo fortification located on the tip of Cape Sagonoseki, which protrudes farthest into the Bungo Channel in the Prefecture of Oita, has been substituted therefor. The reason for this move is apparent when it is noted from the map that the defenses of Hiroshima Bay were powerless to prevent the entrance of an enemy into the Bungo Channel. The Bungo Straits, at the point where the new Hoyo fortification has been erected, are about 10 miles wide, separating the towns of Saganoseki on the west and Sata Misaki on the east.

Thus the three entrances to the Inland Sea are now defended by fortifications at Shimonoseki in the northwest, Hoyo on the Bungo Straits in the southwest, and Yura on the southeast at the entrance of the Kii Channel into the Inland Sea.

(2) *Reorganization of the defenses of the Sea of Japan.*—Until the construction of the new Iki fortification the defense of the Sea of Japan was consummated by the fortification at Hakodate on the Tsugaru Straits on the north, and by the fortifications of Tsushima and Chinkai Bay on the south. However, it was considered that the fortification of Tsushima was incapable of affording complete protection to the Tsushima Strait, and accordingly the new fortifica-

tion on the island of Iki has been constructed to further protect the southwestern entrance into the Sea of Japan.

NOTE.—The fortification of Iki, in the defenses of the Sea of Japan, is to mount 16 inch guns next spring, and it is not unlikely that the same will be the case with the Inland Sea fortifications.—Ed.

MEXICO

A. NAVAL

1. Personnel.

The following figures show the latest statistics on the regular personnel of the Mexican Navy:

Officers of flag rank	4
Captains, commanders, lieutenant commanders, lieutenants	44
Junior officers	142
Enlisted men	482
Total	672

B. AERONAUTICAL

1. Purchase of aeronautical and military equipment.

[Source: Mexican press]

The necessary steps have already been taken for the acquisition of new airplanes to reenforce the air service of the army, increasing the number of machines that are at present available for the requirements of the service.

As we were informed, the purchase of the new machines is being made from the best-known factories of the United States by technical officers especially commissioned by the Ministry of War and Marine, who are now about ready to close the deal, lacking only the approval of the Ministry of War.

Our army will not only be strengthened by the airplanes which are about to be acquired, but also by the military equipment which is about to arrive from Germany and which was bought by the Government in that country through Gen. Celestino Gasca, who made the trip expressly for that purpose.

This equipment, according to official data, should arrive in this capital during the first part of the coming month of October. It consists of field artillery of different caliber and rapid-fire guns of the latest models, which have been manufactured in Germany.

Complete machinery for the manufacture of cartridges is also due to arrive, which will be set up in the Belén factory, and which work will be done by experts who were especially contracted for in Ger-

many. Instructors will train our workmen in its management as soon as the installation is made, which will be in the month of January of the coming year.

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2. Planes to be purchased for the Mexican Army.

[Source: Mexican press]

By authority of the President of the Republic, a contract was signed yesterday with an important American firm for the purchase of airplanes equipped with four machine guns for the national army.

Yesterday a technical commission was appointed to go to the factory situated in Santa Monica, Calif., to inspect the construction of the planes. This commission will leave to-morrow and will be composed of the aviators, Lieut. Col. Samuel Rojas and Capt. Agustin Castrejón, and by two expert mechanics.

The number of planes that the Government will acquire is not given out, but we do know that it will be a fairly good number and that some will be used in the Yaqui campaign.

They were able to inform us that the planes selected to equip the Mexican Army are of the same type as those used by the American Army, as are also the machine guns.

The commission to oversee the construction of the planes has instructions to study them in detail, even to their most insignificant parts, in order that they will fully understand them, which will facilitate their operation and, whenever necessary, their repair.

The first planes received will be sent to the Yaqui region in order to be used in the campaign against the rebellious Indians.

The said airplanes are to be delivered as soon as possible.

NETHERLANDS

A. NAVAL

1. "Soemba" and "Flores."

The Dutch gunboats *Soemba* and *Flores* have been reported as having arrived in the Dutch East Indies.

NOTE.—These vessels are of 1,670 tons, mounting 3–5.9-inch guns, and with a speed of 15 knots, being designed especially for Dutch East Indian service.—Ed.

2. *Visit of British squadron to Amsterdam, September 11–18, 1926.*

The Second British Cruiser Squadron, consisting of the cruisers *Curacao*, *Cleopatra*, *Cambrian*, and *Cornus*, paid a visit to Amsterdam from September 11 to 18. The squadron was under the command of Rear Admiral W. A. H. Kelly.

The Dutch cruiser *Heemskerk*, under command of Capt. Schenk de Jong, was at Amsterdam to receive the squadron. The Dutch Navy Department detailed a liaison officer for duty with the British admiral.

This is the first official visit of a British squadron to Holland since 1921.

The squadron was received with great cordiality by the officials of the Dutch Government, the municipal authorities, and the people generally. An official dinner was given at Scheveningen by the Dutch Government in honor of the visiting admiral and officers. On this occasion toasts were exchanged between Mr. Lambooy, the Dutch Naval Minister, and the admiral commanding the British squadron. After drinking the health of the sovereigns of the two countries, the Minister of Marine expressed the hope that the visit would result in tightening those ties of friendship and mutual good will which unite Holland and Great Britain. Both nations, he said, are seafaring countries with distant colonial possessions; they had and have still many common interests, and in many respects they are similar in their views, their institutions, their ends, and ideals. After praising the British Marine, the Minister concluded:

> We admire the British Navy for its strength and still more for the spirit which animates it. This spirit is one not of aggressiveness, but of order, justice, and protection of the weak.
>
> That, in my opinion, is the reason why, despite her power and strength, we as a small nation regard the British fleet not with suspicion and fear, but with faith and confidence; and that is why we regard a strong British navy as a great and noble guardian of our country.

I have been impressed with the attitude of most Dutch naval officials toward the British Navy. The present chief of the naval staff, Rear Admiral K. F. Sluijs, was for two years naval attaché at London and is an open admirer of everything British—officers, men, and material. The same attitude prevails generally throughout the Dutch Navy.

3. State budget for fiscal year 1927, navy.

The following is an extract from the 1927 budget:

NAVAL ESTIMATES FOR 1927

HOME NAVY

	1927 (in florins)	1926 (in florins)
Total	40, 982, 965	44, 102, 903
Borne by Dutch East Indies	4, 953, 250	5, 707, 510
Borne by Netherlands	36, 029, 715	38, 395, 393

NEW CONSTRUCTION—DESTINED FOR DUTCH EAST INDIES

	Florins
Sumatra—last installment	600, 000
(Light cruiser, 7,050 tons, ten 5.9-inch guns, no torpedo tubes, 12 mines, 30 knots.)	
K–XI, K–XII, KX–III—Torpedo Ordnance	80, 000
(670/820 tons, 15/8 knots, four 18-inch and two 21-inch torpedo tubes, one 3.5-inch gun.)	
Two destroyers (1924)	2, 231, 200
(1,620 tons, 34 knots, four 4.7 inch guns, two 3-inch A. A., six 20.8-inch torpedo tubes, carry 24 mines and 1 seaplane. Designed by Yarrow.)	
Two destroyers (1925)	2, 923, 300
Two destroyers (1926)	3, 622, 000
Two destroyers (1927)	450, 000
Total	9, 906, 500

One-half of this cost will be borne by the Dutch East Indies.

NEW CONSTRUCTION—HOLLAND

	Florins
Torpedo ordnance (0–9, 0–10, 0–11)	57, 700
(515/615 tons, 12/8 knots, five torpedo tubes, one 3.5-inch A. A. gun. Completing.)	
One submarine (small)	250, 000

An effort is being made to effect economies, and the 1927 budget fails to provide for the following details:

Chief of department of personnel.

Inspector of marines.

Inspector of medical service.

It further provides for a reduction of personnel in Holland of about 250 men.

The minister of marine is being criticized because of his economies in regard to the navy, and must turn for support of his program to the Social Democratic Labor Party and the Radicals of the Roman Catholic State Party.

B. AERONAUTICAL

1. Dutch East Indian air force.

The five Dornier seaplanes, "Wal" type, manufactured by the Societe di Construzioni Meccaniche di Pisa for the Dutch Navy in the East Indies, have been completed, successfully passed inspection, and have been accepted. They will be shipped via commercial transportation to the Dutch East Indies.

NOTE.—With the acquisition of these the Netherlands Government will have a total of 32 planes of various types in their East Indian possessions. They are constantly augmenting the naval and air forces in this territory.—Ed.

PERU

A. NAVAL

1. Peru.—Argentine dispute.

In a recent edition of El Tiempo of Lima, Peru, reports published in Chile regarding the military, naval, and aerial preparations of Peru have been reproduced. According to these publications, it appears that the recent departure from Tacna and Arica of a considerable number of Peruvians, together with the purchase of two new submarines from the United States, the remodeling of the two cruisers *Grau* and *Bolognesi* by that country has been interpreted in Chile as significant of warlike preparations in Peru.

The Mercurio of Santiago is quoted in the Lima newspapers as saying:

* * * It is likely that the Peruvian General Staff has prepared an aerial attack against the territory in dispute, counting, thanks to its excellent information service, on the fact that Chile has no aviation forces in that zone. * * *

It is likely that Peru thus desires to prepare a military attack on the region and is even now placing in safety the small part of the population recognized as being Peruvian. Peru has greatly improved her military aviation service. This branch of the army is well equipped and is continuing the acquisition of new units. Peru is spending a great deal of money on its aerial navigation service and on submarines and has based all her hopes on a sudden revenge carried through with the help of these two modern arms. * * * Chilean aviation and submarine services are insufficient to cope with those in the possession of Peru.

* * * * * * *

I am reliably informed from Peru that the strength of the army air service has not been increased during the year: no movement of squadrons: no unusual flying: aerial forces of Peru remain fixed at 2 new Douglas bombing planes ordered last year for the navy; 8 naval-training planes, and 24 army planes, latter mostly in poor

condition and none of them ready to fly as far as Tacna; technical training of Peruvian Army aviators has made little progress of late and is far from being satisfactory; the only serviceable submarines belonging to Peru are the two recently constructed by the Electric Boat Co. and which are still in American waters.

Following is from El Tiempo, Lima:

CHILEAN ADMIRAL SPEAKS OF PERUVIAN NAVAL ARMAMENTS

He declares that they constitute a grave menace to Chile. After making a curious parallel of the naval elements in the possession of the two countries he concludes by urging the Moneda to strengthen the Chilean fighting fleet.

The Chilean Vice Admiral don Luis Langlois, who occupies a position of prestige in the naval circles of the neighboring country, has just published in a newspaper of Santiago, under alarming headlines, a curious parallel of the war fleets in the possession of Chile and Peru, including the units recently acquired by the nation of the south. The vice admiral, after comparing in his own way the warlike possibilities which accompany each of them, concludes by declaring that Peru is stronger than Chile, and so clealry that Chile is forced immediately to undertake the complete overhauling of her present fighting fleet.

The Chilean admiral in drawing up his article has maliciously exaggerated, and for home-consumption purposes only, the military value of our war craft. It is clearly seen that the purpose of the chief of the navy of the South in inserting in a Santiago newspaper the characteristics which he supposes applicable to Peruvian ships is to excite the chauvinistic sentiments of his people, in order to form within the confines of his country an atmosphere of irritating hostility toward our country that may serve the international policy of Chile and harm the good name of Peru abroad.

Chile, not just recently but for several years, we might say since the debate was started in regard to the problem of the Pacific and the people of the South started to distrust the just solution that was to be applied to it, has endeavored to surpass Peru in the matter of land and naval armaments. Still fresh is the memory of the vote submitted by the officers of the Chilean Navy urging the Government of Santiago to start a vast program of naval constructions. As a pretext to carry out without resistance in South America such an antipeaceful attitude it was claimed that Peru has decided to modernize the *Grau* and the *Bolognesi*, the two small cruisers intended for safeguarding our extensive coasts, which are unprotected and subject to the mercy of the audacious hand of any people of South America addicted to conquering and plundering territory.

The dispute of the Pacific has entered into an entirely unfavorable phase for Chile, as was logical to happen, since neither justice nor law support the international policy of that people. It has been enough for our country to obtain a resounding diplomatic triumph and for Chile to experience one of those failures which carry with them loss of prestige before world opinion, for an immediate recrudescence of military agitation in the South, and for all the conspicuous elements of Chile to start exciting the public opinion of their country with the ridiculous national phantom that Chile is exposed to attacks from Peru and that the scanty units which we have afloat constitute a grave menace for the "tranquillity" of the interests of our brothers of the South.

Even Vice Admiral Langlois, an old Chilean sailor who should maintain himself on an elevated plane as pertains to the high naval rank he holds, takes part in the chauvinistic cry and adds his efforts to the rude task of accusing

our country of engaging in warlike preparations and attributing to it imperialistic desires which we have never felt nor are desirous of disputing with the politicians and writers on the pay roll of the Moneda. Their article, which we quote, taken from El Mercurio, proves our assertion. The chief of the Chilean Navy describes in it with extravagance of details the naval elements of Peru and points to the danger that those elements in themselves contain for the national security of Chile.

Our readers very well know that Chile can not digest calmly the fruit of her territorial conquest. She fears that some day there will appear the sword that shall repair so many injustices and so much international misery. Her life is perturbed by the unknown that envelops the future of the nations of the Pacific. She is oppressed by the weight of her own guilt. That is why she sees visions all along her frontiers; particularly along her northern frontier, from where is to come the moral sanction of her crimes.

The Chilean vice admiral is quoted by the El Tiempo in part as follows:

If the naval forces of Chile are briefly examined and compared with those of Peru, our attention is immediately drawn to the disproportion which exists between the number and power of the units which both countries possess. It will be said by those who judge these matters, without considering their practical utility in modern wars and the objectives they must reach, that Chile possesses an overwhelming superiority. Nevertheless, as we are going to show, the numerical superiority that we possess is of little or nearly no use to oppose or combat the elements which our neighbor will have within a very short time.

The mere mention of operations [against Peru—Ed.] will permit us to judge what kind and quantity of material we would need to carry them out and will make us understand that for the Peruvians, in order to defend themselves or render futile our attacks, it would be enough to possess in naval material naval cruisers of high speed, submarines, good defense with mines, and naval and military aviation.

But these elements which Peru already has and is on the way of acquiring will not only serve her for her defense but will permit her to make a cruiser war which would be lamentable for Chile if the means to check it are not provided. Unfortunately, we do not to-day possess those elements and we are completely unarmed.

Peru possesses two small submarines, the *Ferre* and the *Palacios*, which would be reserved exclusively for the defense of Callao and of all its maritime zone, with a radius of some 100 miles to the north and south of that port; that is to say, the region whose objective would be the operations of the enemy. It is said that they are in bad condition, but we are aware (because recently we had occasion to pass along the Peruvian coast and to obtain some information) that they are being repaired actively in the submarine arsenal, which is about to be finished on the island of San Lorenzo (in the bay of Callao itself). These two units, although a bit antiquated, would serve for patrolling, and the fact of their existence alone would force the enemy fleet not to venture into that zone except with very effective elements of protection and only in case of a decisive operation.

The cruisers *Grau* and *Bolognesi*, more or less of the size of our *Zentero* but with a speed superior to our *Chacabuco*, have just been repaired in Balboa (Panama; North American dockyards); their boilers changed and adjusted for the use of petroleum instead of coal, which would increase its radius of

activity (the power to navigate greater distances without the necessity of taking more fuel) and would permit them to maintain their high speed for a greater length of time than with the use of coal; its artillery revised and modernized with the North American systems, which increases its effectiveness 100 per cent; radiotelegraphy of greater power, modern torpedoes, and blockade mines. These two units are to-day in a better condition than our *Chacabuco*, which is the fastest ship of that type that we possess and they could run from Callao to Punta Arenas and return without the necessity of providing themselves with fuel; that is to say, they could easily maintain themselves as cruisers along our coast between Talcahuano and Arica for many days, carrying out all kinds of hostilities.

The configuration of our coast, extending from north to south along an immense ocean, allows a cruiser of this kind to escape toward the west and free itself from being overcome by superior force unless it were shut in as was the *Huascar* at Angamos.

Peru had contracted in Italy the construction of three submarines christened with the names of *Tacna*, *Arica*, and *Tarapaca*, but the failure to pay the first installments, we understand, resulted in the annulment of the contract.

On the other hand, in the United States two submarines have been constructed which will very soon arrive in Callao and which are the last word in this kind of armament, with all the improvements and elements that were experimented on in the war and which have been perfected later. It is the most effective arm that any country can employ in a defensive-offensive warfare; the characteristic of Peruvian strategy.

Chile possesses nothing that may be opposed to these units in an effective way, because with a surface speed of 24 knots they can only be caught up by our torpedo chasers and with the power of submerging in half a minute to a depth of 100 meters, they would escape any direct attack. Provided with a gun that may be fired half a minute before submerging they would resist any patrol, and with it bombard—from a distance of 10,000 meters—almost without being seen, a transport, an undefended port, ship yards, etc.; with a radius of action of 10,000 miles, they could make expeditions to our coast for three or four weeks without the necessity of returning to their base at Callao.

The Peruvians propose to acquire six of these ships, and they will succeed in doing so.

* * * * * * *

Regarding the *Ferre* and *Palacios* mentioned by Admiral Langlois as being repaired for active service, information from Peru indicates that these have been completely dismantled and that such parts of the machinery as were still intact have been placed in the Naval Training School for training purposes and the hulks abandoned as entirely worthless. It is understood that one or both of these hulks have sunk of their own accord. Further, Admiral Langlois's statement that the *Grau* or the *Bolognes I* could run from Callao to Punta Arenas and return without refueling is a gross exaggeration, as neither of these cruisers could make the one-way trip from Callao to Punta Arenas without refueling.

NOTE.—The dispute between Chile and Peru over Tacna-Arica has engendered serious animosities, of which the above is an indication. The Mercurio

is one of the largest and most influential papers of Santiago; the El Tiempo is rather rabid on the Tacna-Arica dispute and, on the whole, is rather anti-everything but it is influential in Peru. Admiral don Luis Langlois Vidal is a lieutenant officer, a gunnery expert, and author of "The Influence of Sea-power Upon Chile."—Ed.

RUSSIA

A. NAVAL

1. Summer maneuvers.

[Source: M. I. D.]

Recently the Soviet Navy held maneuvers in the Baltic and the Black Seas.

The Baltic Sea maneuvers lasted from August 9 to 13 and took place between the entrance to the Finnish Bay and Gotland Island. They were attended by the *Marat* (23,000-ton battleship), a group of torpedo boats consisting of six units, and a submarine detachment of unknown composition.

The aim of the maneuvers was to—

(*a*) Examine the combat training of the crews.

(*b*) Examine their general efficiency.

(*c*) Test technical installations.

On August 11 there was organized a submarine attack on a squadron. The results were favorable for the submarines.

On the flagship (*Marat*) were present, in addition to the ordinary staff, the Revolutionary Military Council of the Baltic Fleet "Rewwojensowiet Baltijskowo Flota," composed of Wiktorow, Smirnow, and Kirejew, graduates of the Naval Engineering School, the inspector general of the red army, Kamieniew, and the representative of Communist Professional Unions, Ugarow.

The Black Sea maneuvers started on August 5, and on August 15 had not been completed. They took place along the South Crimean coast from Sevastopol to Theodosia, attended by cruiser *Komintern*, dispatch vessel *Krasny Moriak*, a group of gunboats (*Niezamozny*, *Udaristan*, and *Apchaza*), a group of submarines (four units), a group of trawlers of unknown composition, headed by the *Kraskom*, the torpedo-boat destroyers *Marti* and *Szaumian*, the hydrographic vessel *Krasny Kubaniec*, and a detachment of hydroplanes.

The maneuvers included—

(*a*) Artillery firing at sea.

(*b*) Coast attacks and defense, attacks by cruisers and destroyers; defense by gunboats, submarines, and hydroplanes.

The command of the maneuvers was in the hands of the commander of the Black Sea Fleet, Pancerzynski, who had his flag on the *Komintern*. The results of the maneuvers are not known.

NOTE.—None of the vessels in the Black Sea Fleet have any offensive value, except, maybe, one or two of the submarines. The *Komintern*, the largest and latest of the surface vessels, is an old protected cruiser of 6,750 tons, built in 1905.—Ed.

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2. *AG submarines.*

"AG submarines" refer to "Amerikanski-Golland" submarines, manufactured before and during the war for Russia in Russia by the Electric Boat Co. In all, the construction of 26 submarines for Russia was undertaken by Electric Boat Co.; 5 were not delivered to Russia; 1 remains at Sevastopol uncompleted.

AG 1 to AG 10: They were all small (some as small as 32 tons) and are all sunk or broken up.

AG 1 (*Som*).

AG 2 (?).

AG 3 (*Kit*) AG 4 (*Kashalot*), and AG 5 (*Narval*) sunk by the British at Sevastopol, 1917.

AG 6 (*B 1*), AG 7 (*B 2*), AG 8 (*B 3*), and AG 9 (*B 4*) lost during operations in north Russia. Were based on Archangel.

AG 10 (?).

AG 11 to AG 26: "H" type.

AG 11 and 12 sunk by Russians off Hango; raised and scrapped.

AG 13 renumbered "16." Raised by the Finns, and at present its hull is lying at Helsingfors in good condition.

AG 14 sunk by Germans in the Gulf of Riga late in 1918.

AG 15 sunk by Russians.

AG 16, 17, 18, 19, and 20: Parts for these were manufactured in America for shipment to Russia and assembly there; after the outbreak of the revolution delivery was held up and they were taken over by the American Navy; they are now out of commission.

AG 21 sunk in the Black Sea.

AG 22 with the Bizerta fleet.

AG 23, 24, and 25 operating in the Black Sea.

AG 26 not completed. At Sevastopol.

NOTES.—AG 11 to AG 26 are of 375/467 tons; speeds of 13/11 knots and carry four 18-inch tubes. Three of these boats took part in the recent Black Sea maneuvers.—Ed.

SPAIN

A. NAVAL

1. Exemption from naval service.

[Source: M. I. D.]

EXEMPTION FROM NAVAL SERVICE

Diario Official No. 191, of August 26, 1926, published a royal decree granting exemption from naval service to Spaniards residing in American countries of Ibero race and in the Philippines, in the following terms:

(*a*) Those applying for exemption are to be residing in the mentioned countries one year previous to the date of enlistment.

(*b*) Youths registered for naval service who leave Spain before reaching 20 years of age are required to deposit an amount ranging from 25 to 50 per cent of the cost of the shipping ticket, depending upon the proximity of their enlistment age.

(*c*) In order to be eligible for exemption from naval service men residing in America or the Philippines will have to pay a variable amount, according to their economic position (just double the amount required for reduction of military service in Spain).

The fixed amount will be paid in 12 annual installments, which is the length of naval service. In the case of laborers the amount to be paid will be of 1,100 pesetas, of which 250 will be paid the first year and the balance divided between the 11 remaining years.

(*d*) Men exempted from naval service who return to Spain before the replacement to which they belong passes to the second situation of active service (first situation, three years) will be required to serve one or two years, according to the time that their replacement has still to serve, before passing to the second situation of active service. If they return when their replacement is in the second situation of active service or in the reserve, they will not be required to receive naval instruction, but will have to continue paying the annual installments for their exemption of the service.

(*e*) Leaves to visit Spain not exceeding four months every year, in normal cases, will be granted to men included in this law. In case of war, all men exempted from service will return to Spain for naval instruction.

The regulations governing this royal decree will be published soon.

COMMENT

For many years the Spanish people have been expecting a Government measure which would permit the return to Spain of those male Spaniards who left their fatherland before completion of their military duties. Men in this situation could not return before the thirty-ninth year of their age (limit of age for military service) or if they did they were taken and enlisted for service. As many were forced to emigrate through unemployment in Spain rather than by their desire of avoiding military service, the foregoing decrees will be well received by public opinion, and will constitute an important source

of income for the Government because there are several hundred thousands of Spaniards within military age in America. It should be noted that the advantages for exemption of military service are limited to Ibero-American countries, with the exception of a few consular districts of the United States. This leads one to believe that official Spain is devoting efforts to maintain the influence of the Spanish language in Ibero-America by favoring the emigration there of her surplus personnel.

SWEDEN

A. AERONAUTICAL

1. The "Flygindustri" of Limhamn.

The Aktiebolaget Flygindustri (The Flying Industry Co., Ltd.), a subsidiary company of the Swedish Aerotransport Co., is located at Limhamn, a suburb just southwest of Malmö in the southwestern part of Sweden.

The plant of the Flygindustriet was recently inspected. The managing director, Lieut. Adrian G. E. Florman, a former army officer and aviator, is in charge. This officer was exceptionally solicitous and everything in construction was shown and all buildings were visited. He has been in actual charge since February 1, 1926, on which date he moved to Malmö to be the resident director. He also stated that he had succeeded in his policy of permitting anyone who had any business connected therewith to visit the plant, for he believed that seeing the plant and ships under construction would not divulge any secrets detrimental to the firm.

There are two assembling shops. The first one also has a gallery in which construction of wings and frames and bulkheads was carried on. This shop had three (type G–23) bombers in various stages of completion. Also a 12-passenger plane which was badly damaged a short time ago while landing at Copenhagen, and which is being repaired here. Although the wings under fuselage were badly damaged, the compartment carrying the passengers was not damaged at all, and none of the passengers were injured. This was due to the fact that the entire shock was taken up by the framework of the wings, and is pointed out as an advantageous point of construction of the Junker plane in which the wing is underneath the fuselage. In the other assembling shop there were four bombing planes and one commercial passenger plane under construction, all of the three motor G–23 type. One bombing plane was being rushed to completion and workmen were engaged on it day and night. The only information I could get was that they were all for foreign countries.

Employ 370 men; has had 640. The bombing machines are exactly of the same construction as the passenger planes with the addition of two positions on top for machine guns; the telescopic turret underneath, and the appliances for carrying torpedoes and bombs. The bomber mentioned above as being rushed to completion is a seaplane and is being provided with appliances for carrying two torpedoes in addition to bomb carrying appliances. All these are carried underneath the fuselage, in front of the lower turret, and the dropping is done from this turret which carries the necessary sighting gear for this purpose.

The general characteristics of the bombers are as follows:

Span, 29.87 meters (97.99 feet).
Length over all, 14.80 meters (48.55 feet).
Height, 4.20 meters (13.77 feet).
Wing area, 93.80 square meters (78.524 square feet, approximately).
Motors, 3 by 450, 1,350 kilograms (2,976.21 pounds).
Weight, 3,700 kilograms (8,157.02 pounds).
Normal useful load, 2,400 kilograms (5,291.04 pounds).
Maximum permissible load, 2,800 kilograms (6,171.88 pounds).
Total normal weight, 6,100 kilograms (13,448.06 pounds).
Maximum permissible weight, 6,500 kilograms (14,329.9 pounds).

In each wing there are four triangular tanks for gasoline, the estimated capacity of each tank being 25 gallons, hence the total gas capacity would be 200 gallons. The motors provided are of an improved type, being Junkers type L–5. It is a water-cooled motor consisting of six cylinders mounted in line; the normal horsepower is 280; the maximum horsepower that can be developed is 310. The ratio of compression per square centimeter is 1:5.5 and the weight, exclusive of the propeller mounting, oil and exhaust pipes is 315 kilograms. It is stated that the motor bed is so arranged that the Junker motors can be replaced on each of the three mounts by the same number of Bristol Jupiter motors of the latest model that develop about 485 horsepower and also the total weight of the motors of this type would be considerably less.

The planes are constructed in six separate parts: a forward and a rear section of the fuselage; two outer wing sections and two inner wing sections, these sections containing the outer motors. The construction is such that sections can be replaced by other similar sections, or similar sections of all planes are interchangeable. It was pointed out that for instance, it is possible in time of war to replace a passenger-carrying fuselage with a bombing-plane fuselage, and a fleet of commercial planes could be transformed into military planes in a very short space of time. Potential military value of these planes is greatly enhanced by this feature.

The immense military advantage of this feature of the type of construction over the wooden construction is obvious. Sections of

planes out of service could be utilized to replace damaged sections of planes in service. In addition there is no woodwork and fabric to catch fire, and this danger is diminished to that extent. As was demonstrated in the firings with the Junker bullet there is still danger from shots through the gasoline tanks, but the wood and fabric construction would be immensely more vulnerable.

The carrying capacity in bombs or torpedoes or both, is 2,000 kilos in addition to the guns and ammunition. The machines are provided with three turrets, the upper turrets mounting each two machine guns and the lower turret mounting one machine gun. The planes that were being prepared for shipment had no machine guns mounted, and upon inquiry as to the type Lieutenant Florman stated he did not know, but inquiry in Copenhagen showed that the Chilean Government had been extremely interested in the Madsen machine gun, and the Vickers representative in Copenhagen stated that Chile had also been interested in the Vickers machine guns for these planes. All information at hand seems to indicate that they will be provided with Vickers machine guns. None of the guns are synchronized with the propeller. The guns in the forward turret, therefore, have a dead space directly ahead through an angle of about 30° parallel to the wings and a vertical angle upward possibly of 5° when the plane is flying horizontally. On entering the cabin just in the rear of the wing on the right-hand side of the plane, the forward turret is about 40 inches from the entrance toward the front. The lower turret is about 18 inches to the rear of the plane. This is a turret that can be lowered below the fuselage and gives a field of fire directly underneath and through an angle of 360° horizontal. The turret rotates. The turret is cylindrical in shape, being bent in on one side to permit the machine gun to fire more or less directly down, therefore the horizontal projection of the turret gives a kidney shape. The machine-gun mount is on a ball-and-socket joint. The apertures are celluloid windows which permit the gunner to see practically in all directions. The turret viewed had the opening through which the machine gun fires unprotected. The space for the machine gunner is not large enough for him to sit down. The turret is constructed of light armor estimated to be not less than 5 millimeters thick and not greater than 8 millimeters. The plane is provided with wooden propellers and the landing gear has wheels tired by Parker cord tires from England. All the directions on the instrument board were lettered in Spanish.

The smaller machine is also provided with the 280-horsepower Junkers L–5 motor. Some of the Swedish aviators refer to this plane as being equipped with a motor type BMW, 350 horsepower, but Lieutenant Florman stated the motor was the type Junkers L–5. It is reported that the plane is equipped with two stationary machine

guns, synchronized with the propeller, and two machine guns that can be maneuvered. This machine has a calculated speed of 215 kilometers per hour and can attain an altitude of 4,000 meters in 15 minutes. This machine likewise appears to be able to have its motor replaced by the Bristol Jupiter motor mentioned above.

The six war planes manufactured for Chile were already completed and the markings painted on the wings. One machine was being dismantled for packing. In addition to the six large planes, there has been manufactured a smaller plane referred to as a two-seater, type R.02, with the commercial designation of S–AAAZ. This machine was not seen and it was not either in the shop or in the shop yards. As far as can be ascertained, this machine is also for Chile, though Lieutenant Florman neither agreed to nor denied this fact.

The average capacity of the existing plant is about five planes per month and estimated maximum capacity working 24-hour shifts is about 12 planes per month. The value of the product for the past year was 2,400,000 krona.

According to Lieutenant Florman, since the inception of the Aktiebolaget Flygindustri in February, 1925, a total of 53 airplanes of the "G23L" model have been manufactured for war and commercial purposes. Of this number, 25 are reported as having been made for three nations in South America, which were to be used solely for war purposes, and 28 machines, including both commercial and combat airplanes, have been made for European governments and firms.

Although the writer has been unable to definitely ascertain the names of the three nations in South America which purchased the 25 combat airplanes, it has been reported that an order calling for nine planes of the "G23L" model had been placed with the local firm in 1925 by the Government of Chile, but, so far as known, only five machines of this type and one small single-motor pursuit plane have actually been shipped to that country.

While Lieutenant Florman would not divulge the names of the two other powers in South America interested in purchasing war airplanes, he stated that commissions from Argentina and Brazil had visited the local plant, and that no other nation in Latin America had manifested any interest in their products. It is known that the three orders from South America placed with the Aktiebolaget Flygindustri called for 6, 9, and 10 airplanes, respectively, or a total number of 25 machines, and no other powers appeared to be interested in the products of the local concern at the time this information was obtained. It is believed that he intended to convey the impression that the 25 war airplanes had been purchased by the Governments of Argentina, Brazil, and Chile, but the exact proportions are not known, nor is it known whether they have all been delivered.

Mention is made of the fact that the plant has been visited by delegations from Poland, Spain, Turkey, and Chile. The French assistant military attaché has also been through the plant. Lieutenant Florman stated that about a month ago one Japanese visited the plant. During the inspection he carried his camera, a note book, and a rule. On special occasions he stopped to measure dimensions of the plane and Lieutenant Florman said he had to request him not to take these details and not to take any photographs.

When questioned regarding the alleged newspaper and other reports to the effect that the Danish firm of Rohrbach had secured a large contract from the Turkish Government for the manufacture of war airplanes, my informant stated that he personally visited the plant of the Danish firm to ascertain the truth of such report, but found that there were less than 50 men working at the plant and that only about 10 or 12 airplanes had been manufactured during the past 12 months by the Danish concern. He was of the opinion that the Rohrbach company was greatly decreasing its production, and that from all indications the Danish firm would very likely suspend operations before the close of the year 1926.

Mr. Florman also added that the only firm which is manufacturing airplanes to any considerable extent is the Dutch concern manufacturing the Fokker airplane, which is reported as having made 100 machines for the Russian Government, but that to the best of his knowledge no airplanes had been made for the Turkish Government other than the one made in 1925 by his firm.

Lieutenant Florman stated that when recently visiting the Balkan countries great interest was manifested in the airplane products of the Aktiebolaget Flygindustri, and that high military officials of the Roumanian Government were exceedingly anxious to ascertain, and practically begged of him to disclose, what orders had been placed with the local firm by the Russian Government. He also stated that much distrust prevailed throughout the several Balkan States, with each nation trying to have him confidentially reveal what activities for aerial defense were being carried on by neighboring powers.

In addition to the orders which the Aktiebolaget Flygindustri at Malmo expects to receive from the Swedish Government and from the Finnish concern, my informant felt positive that his visit to the Balkans would result in receiving orders from several States in that territory, presumably Roumania and Turkey. However, he frankly admitted that no orders had so far been placed with his firm by Japan, nor had further orders been received from Turkey or Russia, although he declined to comment about the prospects for such orders. However, in this connection it should be mentioned that when his attention was called to newspaper reports to the effect

that a Russian delegation had recently visited the local plant, he admitted that this was the second visit of this delegation, and was for the purpose of further negotiations regarding the purchase of more airplanes for war purposes.

The best prospects are to sell to Turkey, Spain, Sweden, and Chile. It is not known how sales are divided with the Junkers works, but there are many indications that the Flygindustri's share in building planes depends greatly on the benevolence of the Junker Flugzeugwerke.

SPECIAL ARTICLES

1. THE "LUTZOW" AT JUTLAND

[By her gunnery officer, Commander Gunther Paschen]

NOTE.—In the September BULLETIN there were published extracts from the above article obtained from an English source. Since that time, the complete article has been received, and, on account of its general interest, and the fact that the former translation was evidently poor and many interesting details omitted, the complete article is printed below.—Ed.

With regard to the fate of the flagship of Admiral von Hipper, which led the German column for three hours and which together with the *Derfflinger* and *Seydlitz* bore the brunt of the battle during the first clash with the Grand Fleet, little has been published. In fact I have often been timidly questioned as to whether or not the ship might have been kept afloat. The day at Jutland on board the *Lutzow* represents the culmination of my naval career, and this ship and its crew are associated in my recollections with a splendid and glorious achievement in the service of my beloved weapon.

For the battle preparedness of this vessel I applied all of the best of my knowledge and ability gained in my studies in the service, and I do not wish to pass over the tenth anniversary of the battle without some commemoration of the ship and her crew.

Placed in commission in August, 1915, a serious turbine derangement occurring on the trial trips kept the vessel out of active service, and the ship was unable to join the battle cruiser squadron until the end of March, 1916. Target practice could only be held very hurriedly and to a restricted extent, but the preparations were so thoroughly made that practice was found to be satisfactory in all respects. However, the first shots with full charge from our guns were fired against the enemy on April 25. That did not bother me, though, as even to-day I contend that a ship can be prepared for battle from a gunnery standpoint without firing a single full-charge shot, and that target practice is only a sort of general test. Given good training matériel, the officers and gun pointers can be trained

to much more difficult problems than are encountered on target practice, during which the ship generally lies perfectly quiet and the target as presented is so little representative of actual battle conditions. In this it is assumed however, that both gunnery officers and gun pointers have been adequately trained as such.

I

The temporary loss of the *Seydlitz* as a result of a mine hit on April 24, following the operations against the English coast caused Admiral von Nipper to hoist his flag on the *Lutzow*—the last doubt as to the battle preparedness of the vessel having been overcome by a very satisfactory battle practice held shortly before the battle. In this, however, the unserviceability of a new device was determined on which I had placed great hopes for the battle.

The trouble lay with a very small fault but same could not be remedied before the battle.

Thus, to the pride of her crew, the *Lutzow*, led the line of German veterans to battle on May 31. With regard to the course of this battle I shall only supplement what is well known in this respect by my own personal observations in so far as they bear on the fate of the *Lutzow*, as well as some remarks on the events which precipitated these experiences.

On sighting the enemy heavy forces at 5 p. m., I was able to clearly distinguish some battleships behind the line of battle cruisers, which were then distant 26,000 meters, a proof of the excellent visibility which obtained to the westward in the initial phases.

[N. B. The times given are in accordance with the German summer time—Central European time plus 1 hour.]

When the battle cruisers swung off on a southerly course these ships held course to the northward, whereby they came into position about 10 miles astern of the battle cruisers and were unable to attack at first. There has been no lack of criticism in England against Admiral Beatty for his failure to close up the fifth battle squadron immediately.

We had had excellent ranges from our range finders from 24,000 meters on, and it seemed like infinity, in reality about 20 minutes, before we had closed to our range of 19,000 meters. Even then we had to wait on account of the somewhat reduced range of the battery of the *Seydlitz*. Five points (57°) was the bearing of the enemy line with respect to the line of fire. Estimated speed, 26 knots; course, 110°. At a range of 16,700 meters, according to our measured range, the first turret salvo was fired from turrets A and B.

During the whole battle the *Lützow* fired turret salvos, alternating between the forward and after turrets, a method of salvo firing which I can not praise too highly. Both guns function as one,

are loaded simultaneously and are elevated by one man. After the load there is quiet in the turret. The gun pointers alternate in training when necessary. The smoke and gases from the gun are then concentrated at one end of the ship and even under the most unfavorable conditions at least one of the control towers can make observations. Only on one occasion did I fire a full salvo from all four turrets; which however, did not encourage me to repeat the experience. This salvo lay short and covered the whole target with a tremendous spray of water. This particular salvo was accidently caught by the camera, and reproduced in "The Fighting at Jutland" (p. 410). Time of flight, 22 seconds. Impact, 12/16 left, ahead of the bow; 12 right. Salvo. One shot from C and D. Impact, over, center. Down 8, salvo. Over. Down 8, salvo. Straddle. A hit near the bridge. A sigh of satisfaction and then to continue. It had taken two minutes before the battery could straddle the target. What is the matter with our range finders? One thousand six hundred meters in error. The trouble can not lie in the difference in the ranges. These thoughts occupy the time of flight. With the enemy it had been exactly the same thing. They had also opened at 16,700 meters and had fired over, taking endless time before they finally pulled down on to the target. The first straddling salvo from the *Lion* after 9 minutes was therefore surprising; a slight hit in the forecastle well forward passed unnoted as well as the fact that both the *Lion* and the *Princess Royal*, the leading ships of the enemy column, were concentrating fire on the *Lutzow*. Our fire now holds well on the target and a change of course of four points to starboard on the part of the enemy is promptly recognized. As early as 5.52 p. m. we counted the third hit over there. A red flame shot up from turret 3, and this was soon followed by a large piece, which was half of the turret roof, flying into the air. After a long period the flames died down suddenly, but the turret officer in dying had been able to have the magazine closed. That fact saved the *Lion* and the admiral.

Personally I am inclined to the opinion that the extraordinary blowing up of the British ships is to be attributed to powder fires which finally resulted in explosions. With us, such powder fires have remained always fires, devastating for that particular turret, but not destructive to the whole ship. In my opinion, there are several circumstances which would oppose the assumption of the detonation of the shell, as the initial point in the resultant explosions.

Seventeen minutes after opening fire the *Lion* turned out sharply until we could see her astern, and the *Princess Royal* then moved in between. I had counted by that time 6 hits in 31 salvos. We had received 3 hits by that time, of which one had detonated between

the barbettes of turrets A and B and had destroyed the forward battle dressing station. There all were killed, including the genial young assistant surgeon, Doctor Schönitz. Hit No. 3 appeared to have been somewhere in the after armor belt, causing very considerable shock but no serious casualty. The distinctly recognized sheering out of the *Lion* by herself is not mentioned in the reports from the other side, but is erroneously reported as a change of course of the whole line. This is contradicted by the photographs in the "Fighting at Jutland," which very definitely shows that the *Queen Mary* was the second ship in line when she was blown up. It is certain that the *Lion* later took over the leadership of the column, but exactly when this occurred I can not say from my own observations.

At 6.08 p. m. we changed target to the *Princess Royal*. The enemy employed large changes of course which were difficult to follow in the smoke and under decreasing visibility conditions. The range varied quickly from 15,100 to 13,000 meters, increased again with the same rapidity to 19,000 meters, and then fell off to 15,000 meters. On the enemy's unengaged side and somewhat ahead there was a destroyer which was smoking considerably and screening the target from us. As the fire-control mast of the enemy was continuously visible above this smoke screen, I suspected that this was a trick on the part of the enemy, who possessed a firing director, but Admiral Beatty declared that this measure was taken to screen the line against submarines, and that the smoke screen had disturbed my gunnery opponent as much as it had me. Meanwhile our enemy had ceased to hit us at all, while our fire still held on and many hits were observed. After the blowing up of the *Queen Mary*, which I could barely observe in one corner of the small field of my excellent periscope (our target was the leading ship), there developed a lively battle between the destroyer forces in between the lines, and the assistant gunnery officer was finally given the long-awaited opportunity for action. This, however, resulted in obscuring the target for me to a great extent. At this time the *Lion* apparently resumed the guide of the enemy column and we again took this vessel under fire, as our target was always the leading enemy ship.

The English have always contended that in the initial stages of the action our fire was fast and accurate, but that soon it fell off in accuracy and even became wild, while their own fire, although slow in getting on, was supposed to have been held constant and accurate. Neither the *Lion* nor the *Princess Royal* were able to make a single hit on us between 6.02 and 7.23, and on the whole only obtained three hits in the course of 1 hour and 35 minutes. During the same period both ships together received at least 12 hits, according to their own reports, which were made by one enemy ship.

The fact that our fire was not as effective in the later stages as during the first 40 minutes of the action is to be attributed to the increasing smoke and poorer visibility conditions which obtained. The latter condition finally became so bad that during the most critical period of the battle, 8 to 9 p. m., we were unable to see a single English ship with the exception of the *Invincible*, which was immediately annihilated. On the other hand, we ourselves lay in the midst of the heaviest enemy fire and must have been very clearly visible against the relatively clear western horizon. In this particular phase of the action, on which the English base their claim for superiority of gunfire, the German fleet was only acting as a target and was not in the position to fire a single shot.

Admiral Scheer extricated the fleet from this very unfortunate situation in a masterly manner.

But to return to the events of the battle. One small occurrence near the opening of the action was at once quieting and surprising. Two short salvos from the enemy ricocheted from the surface of the water and wobbled comfortably way over our heads. These showed as two long white streaks which I was able to recognize as common shell loaded ith black powder. And this also corresponded in general to the effectiveness of the British shell. The full shock of the major caliber shell resulted on impact, together with a tremendous amount of shock and a large hole. That was all, however, and the explosive effect was relatively mild. One time the whole of the forward fire-control station was filled with the well-known smell of black powder, which brought a laugh of understanding. We also received some high-explosive shell from the enemy ships, but apparently no armor-piercing shell with explosive charge, and the effect of the first named were only superficial. On the other hand, the effect of our own shell was quite otherwise, as naïvely stated by an English ensign at the barrack in Wilhelmshaven: "Every 12-inch shell blew up a quarter of the ship." He was one of the nine survivors of the *Queen Mary*. What a tremendous amount of money and time did the systematic development of these shell and fuses cost the Bureau of Ordnance of our Navy Department and the good old firm of Fried. Krupp. Even to-day my one regret is that, on account of the general instructions strengthened by the advice received from authoritative officers shortly before the battle, I did not fire armor-piercing shell at the beginning of the engagement, but opened with H. E. shell. In this connection it is noteworthy that one of these shells penetrated the turret roof at a very small angle and detonated instead of breaking off.

One very disturbing factor is the large masses of water which are thrown over the ship by the enemy "shorts" when they lie close aboard to the leeward. The water poured down in tons. Our target

bearing periscope was led through a 30 centimeter hole in the armored roof in order that it might have plenty of play. The sealing of this hole was accomplished by means of a sailcloth collar which was weighted with lead at the edges and spread over the roof of the station. But the cloth blew up as a result of the blast from our own guns and obscured the objectives, so that same had to be cut off, making the fire-control tower nice and light but exposing it to the spray. The seaman who performed this amputation, Seaman Hartmann, voluntarily remained on the roof of the control tower throughout the entire engagement and calmly wiped off the lenses when same became clouded with moisture and powder gases. We were all wet through to the skin and after a short time unable to meet his demands for dry cloths to wipe off the objective lenses. The fogging of the objectives by the spray was exceedingly troublesome and at times even put the target bearing director out of commission. Some remedy for this condition was urgently needed.

The High Seas Fleet came into sight ahead. The enemy battle cruisers immediately turned away on the reverse course which we followed in turn about five minutes later, also turning out. As a result the range increased rapidly, the English battle cruisers bearing four points on the bow and drawing away to the limit of our range. This was possible since we had at the time reduced speed to 18 knots from 7 p. m. on. Fire was only maintained when opportunity offered since the visibility was considerably diminished. Not until Admiral Beatty knew the Grand Fleet to be in the immediate vicinity did he close again. At about 7.41 we received a heavy fire from his force and four hits were made in a short time. Two of these penetrated from above into the large 15 centimeter casemates, destroying both radio stations and causing a large number of casualties. Another shell detonated amidship between decks, without, however, causing serious damage to the main protective deck. But in the gunnery central station immediately under this point the fuses were blown and in some manner smoke penetrated into this compartment. The fire-control system was interrupted for a moment, but was immediately thereafter in operating condition. Our own smoke drew along with the ship and for a time I was forced to relinquish the control of the fire to the after station. For the time being the enemy has the upper hand and I could not get rid of the feeling that something momentous was brewing.

Then the unexpected happened. From the right to the left a ship passed across the field of the periscope, astonishingly large and close aboard. With the first glance I recognized an old English armored cruiser and gave the necessary orders. Some one grabbed my arm and cried: "Don't fire, that is the *Rostock*." But I saw the turrets on the forecastle and the quarter-deck. "Running fight—armored

cruiser, 4 stacks, bow left—left 30." "Range?"—7,600 meters—"Salvo." Salvo followed salvo in short order, of which three straddled. Then the performance was repeated of another English ship blowing up before the eyes of both fleets, as the *Defence* was in sight of the British fleet at the time, although the latter was invisible to us. Astern of this vessel there followed another which we left to the ship following astern of us as the English battle cruisers then demanded our entire attention. These were then on our port quarter—as we had turned on course east—were distant 13,000 meters and could just barely be made out.

Thereupon a series of events occurred which made all of the preceding engagement seem like play. While our own powder smoke had obscured the target from me for a time and I had been forced to delegate the control of the fire to the after station, we were suddenly struck by shell coming from the port quarter and the port bow. On this bearing nothing could be seen but the flash of gunfire—not even the shadow of a ship. Our turrets were all trained hard on the port quarter, firing as well as they could on our old friends, Admiral Beatty's battle cruisers. One shell from these vessels penetrated the upper deck in the wake of the forward stack, passed into the casemate and exploded behind the barbette of turret B, where it caused a serious fire as well as tearing out both armored doors leading from the casemate on to the forecastle. The detonation occurred immediately under the conning tower, but did not damage same nor the single 15 centimeter casemate immediately forward of this point. One shell from ahead struck the right gun of turret A, striking at right angles at the point where the gun projected from the turret face, breaking off a large piece. Thereupon the shell passed obliquely upward against the right side of turret B. The shell splintered, but the 250-millimeter plate was penetrated and the part cut out was thrown into the turret. There it damaged the loading gear and killed the personnel serving the gun as well as setting fire to one main and one forward powder case which were lying in readiness in the hoist. The turret officer was killed and the turret captain rendered unconscious. Lights were all out and all fuses for light and power were blown, the pumps empty, the turret full of smoke and glycerine, but the left gun behind the splinter bulkhead with its personnel was undamaged. The gun captain, chief turret captain's mate, Klopp, one of the best petty officers I have ever known, succeeded in getting the turret with the left gun clear for action after half an hour with the assistance of Machinist's Mate Arnold. The pumps were filled with sea water from the fire mains.

The fatal flashes of gunfire from the port bow came from the British III Battle Cruiser Squadron, which, somewhat in advance of the

British main body, was steering for the gunfire. Unseen themselves, they were able to approach to within the most effective range. It is probable that at this time we received from them the fatal damage, even though its full effect was not realized until later. Every ship has its weak points, and our "Achilles heel" was the broadside torpedo room located forward of turret A. Here the torpedo bulkhead had unfortunately been left out in order to make more room. This bulkhead furnishes one of the best possible protections against underwater hits and distinguished the German ships so advantageously from all foreign ships. Therefore, it was possible for these two enemy shells which struck below the armor belt to penetrate this space and to explode with such effect that the whole forward part of the ship, up to turret A, was completely flooded. The whole ship gave a tremendous lurch, the control tower would not stop vibrating, and I was thrown head first against the armored wall of the control tower as I tried to remove one of the slit covers. The target-bearing indicator was again entirely under water.

From turret A there followed a report of the damage to the right gun and the fact that the magazines were slowly being flooded by the water penetrating the handling rooms. Unfortunately the interior of the barbette had a small hole in the protective deck communicating with the torpedo room, an emergency exit, the door of which had been sprung by the explosion. When the cause of the penetration of water had been determined it was unfortunately too late to remedy the situation. The hole was deep under water in a small inaccessible space.

Meanwhile we had turned off on a southerly course, when suddenly there appeared from the mists the distinct outlines of an English battle cruiser of the Invincible type bearing 4 points on the port quarter and relatively close aboard. I can not express the satisfaction I felt on suddenly finding one of these tormentors appearing distinctly before my eyes, and the orders are out like lightning. But already a dark object appeared before the objective of my periscope—the corner of the Admiral bridge unnecessarily restricted the training arc of my periscope by 10 degrees. "Has the after station the range?" "Yes; 10,000 meters." "Control from after station." Lieutenant Bode then took over the fire control and 15 seconds later, to the joy of the whole ships company, our guns spoke again, with the exception of turret B. I can hear every order passed by Lieutenant Bode and the gunnery central station, and can now see the enemy again. "Over, 4 down, salvo, straddle." As the gongs of the impact clocks sounded there was again the flare of the unmistakable dark red flames from the midst of the water spouts surrounding the enemy. Such shooting indications, to use a hunting expression, make an indelible impression when they are twice ex-

perienced. And, as a matter of fact, only a few seconds elapsed before the red flames spread over the entire ship and this ship also blew up. It was the *Invincible*—the invincible one conquered. The *Derfflinger* had also fired on her at the same time. I certainly do not wish to dispute the result for myself against my brother in arms, but in justice to Lieutenant Bode, I must say, that I can have no doubt as to the basis of this result. The noise, the straddling salvos, and the red flames all coming together were unmistakable and as clear in my memory as though it had occurred yesterday.

With this, our rôle of leading ship was ended. At 8.43 p. m. the *Lutzow* sheered out of the line in order to reduce speed; the water penetrating in the bow was too great. Four of our torpedo boats then laid a smoke screen between us and the enemy and immediately we were out of the heavy fire. Pause in the action. After three and one-half hours I was able to leave the control tower for the first time. The admiral and his staff are just about to leave the ship: friendly and unperturbed as ever, he spoke a few heartfelt words of recognition and farewell to those standing near him. As he embarks on a torpedo boat coming alongside, our battle cruisers slowly pass by to starboard. We have no time for a careful observation as they pass, but we can count four of them to our great satisfaction. *Derfflinger* and *Sedlitz* seem to be drawing more water than usual, but otherwise appear to be in good condition.

Then a quick look around our decks, which can hardly be recognized. The chart house is in ruins, as all houses of cards have a way of doing. (Translation note.—In German "Chart house" and "house of cards" is expressed by the same word—this is a play on words.) Of the forward turrets, turret B is trained hard over to port and smoke is pouring from all openings. This turret should have been trained ahead, so something must have happened. I had had no reports regarding this turret, but from the central station came the dreaded confirmation "B turret does not answer."

Then the dance began again. Flashes of gunfire from out of the mists to port. "Man the guns." With one jump I am back in the control tower. "Target bearing director," "Range 10,000 meters, aim at the gun flashes, salvo." Not a gun fires. When the enemy guns flash again the order is repeated, "Salvo." No shot is fired. It is impossible for the gunpointers to get on. If we only had the firing director. Two or three hits further aft shake the ship. One of these explodes between turrets C and D at the after dressing station, causing numerous losses among the wounded, the surgeons and the hospital corps.

At the same time one of these shell breaks the electric power cable to turret D, which, for a short distance had been laid above the protective deck—an exceptional procedure. Such places are always

found by the shell with deadly certainty. Turret D is forced to resort to hand operation, which, in the case of a 30.5 centimeter (12-inch) turret is equivalent to a complete breakdown. This shell also damaged the main protective deck—the only instance of this happening—without, however, damaging the powder magazines lying directly beneath.

At this time we must have disappeared from the view of the enemy; although the whole English line passed by us, we were not taken under fire again, and could devote all our energy to clearing ship. There was much to be done. First to turret B. A large number of dead lay on on the small platform near the turret which had not been there before, so that some of the personnel at the guns were still alive. Then came a report from the turret: The left gun is clear for action. There, the turret is slowly being trained to position. On the right gun of turret A there is a large piece missing about 1 square meter in area, a half ring. The muzzle is depressed as the elevating gear of the turret is out of commission. I find then that I have still four major caliber guns left for the night action. The intermediate battery after inventory shows 3 guns in condition out of 14, of which there is only 1 gun in the starboard battery. Of the eight searchlights only one is intact, the port light, and even there the controls are missing. Therefore, a chain of messengers from the unengaged batteries order the electricians to start repairs on the power leads to turret D. I reported the condition of the battery to the captain, who was calmyly and confidently reviewing the situation. Meanwhile the ship had stuck her nose deeper into the water until the upper edge of the bow was completely under water. I learned that the whole forward part of the ship was flooded with the exception of one small electrical distribution room, in which there was a number of men, deep under the water in the upper platform deck. No help for them was possible.

Turret A reported that the magazines and shell rooms had to be abandoned after saving as much of the ammunition as possible. The magazines of turret B were also taking water but it could be kept under control.

The *Lutzow* was the first ship to be fitted with a sectional drainage system, the drain pumps for the forward, center, and after parts of the ship being divided into groups for each division. The forward group was out of commission as a result of the flooding of this part of the vessel, so that the forward division could be drained by sluicing the water amidships. However, as far as I am aware, the devices for sluicing the water from the forward part of the ship became submerged and could not be operated while the ship was steaming at full speed ahead.

These unfavorable circumstances appear to have been the direct cause of the loss of this ship. I drew a sigh of relief when the stations

had been manned for the night action. It seemed impossible that we would not be attacked during the night. When it was nearly dark the spotter came down from the foremast. He had had the best station to observe all that happened. On his head he wore the rim of his cap, the cover together with his head telephone having been torn off by a splinter, a circumstance which he had completely forgotten. He inquired of me regarding the situation, and I replied, "I hope that no torpedo boats will find us during the night; what happens to-morrow is on the lap of the gods."

On the urgent recommendation of the first lieutenant, the speed had been reduced to 8 knots, but in making turns for this speed the ship was able to hold a bare 5 knots on account of the bow being so deep in the water. The very low forecastle—*Lutzow* had no upper deck—was now completely submerged. Meanwhile a sea had kicked up from the southwest which swirled between the mountains of empty cartridge cases on the forecastle.

We were all deathly tired, officers and men, and the night drew on endlessly. What of the morning? We had seen both fleets draw out of sight to the southward still fighting. At midnight gunfire and searchlight beams flashed out from this direction.

To us it seemed there could be no doubt that the engagement would be renewed in the morning, and the contact should be lost during the night appeared out of the question. Could we render aid in this fight? I should have liked to talk to the first lieutenant to find out if there were any possibility of holding the water at the level at which it stood at the time, but he could not leave the central station nor could I leave the bridge. I still had hopes for the ship, but at 2 a. m. the captain called all the senior officers in to conference and the first lieutenant reported that there were then 7,500 tons of water in the ship and that the vessel could not be kept afloat beyond 8 a. m. in the morning. That splendid ship. But it had to be, as the forecastle was then 2 meters under water and the water was even then pouring in through the open doors of the casemates past the battery and through the openings which had been torn in the deck. The large oil-burning firerooms forward had had to be sacrificed in order to save the personnel stationed there. The draft was then 17 meters. The captain, who up to that time had calmly and determinedly held his course toward the point where the fleet has last been sighted, was forced with a heavy heart to abandon ship in order to avoid the useless sacrifice of life which would have resulted to a great extent had the vessel sunk with all hands. One last attempt which was made to steam with the ship going astern failed as she could not be steered into the wind and sea.

Shortly before 3 a. m. came the order "All hands muster aft," and the four torpedo boats which had remained with us during the

night were called alongside the starboard quarter. I had not thought of these boats and was agreeably surprised to find that I would not have to swim. As long as there was time I went through the ship with the other officers and trusted men to seek out the wounded and men who were sleeping. Right; I found one brave lad who was calmly sleeping on the workbench in the ordnance repair shop.

The picture presented by the large 15-centimeter battery was one of indescribable havoc and destruction. There we had suffered our greatest loss in personnel. In turret B it was too dark to see anything, but I heard with great satisfaction from the survivors that the fire in this turret had been localized to one main and one forward powder case. On the *Lutzow* extensive measures had been taken to prevent the spread of fire in the turret and these measures had proven completely satisfactory. Unfortunately, the commander of this turret, Lieutenant Fisher, had fallen a victim to this fire, but those in his immediate vicinity, although severely burned and half suffocated, had been rescued. And finally the repairs to the electric power cable of turret D had been satisfactorily completed—a masterpiece.

The disembarkation of the crew followed according to the muster roll, first the wounded and then the rest. As we shoved clear with the last boat I saw the ship again in the early dawn in the following condition: Turret A was under water and turret B was an island. At the bridge the water was up to the upper deck. The stern was about 2 meters higher than usual. Then one of the boats fired a torpedo which struck amidships, and the ship heeled to starboard and down by the head after a moment. It needed another shot to shorten the time of sinking by one or two hours. As early as 6.45 a group consisting of 1 enemy light cruiser and 4 destroyers reached the spot where the vessel sank and would have achieved an easy victory. After our boats had been engaged with these and another group of enemy destroyers in a short action we were taken aboard the *Regensburg* during the forenoon and landed that evening at Wilhelmshaven.

With regard to the conduct of the personnel in the service of the battery under my command, I can only say that the promptness and accuracy with which the salvos were fired for hours at a stretch in the midst of the most severe fire from the enemy, would have delighted the heart of any gunnery officer. From all sources I have heard nothing but praise for the conduct of our men, and, I should add, I expected nothing different.

The ordnance matériel, the turret arrangements, the guns, the battle order and fire control apparatus operated without the least disturbance and functioned perfectly throughout the whole battle, in so far as they were not demolished by the enemy gunfire. The last named should be particularly stressed, as it shows that the most

complicated technical apparatus is thoroughly reliable when it is adequately protected and cared for. I can not, however, pass without comment the fact that in my opinion two devices were lacking which we might have had, had the knowledge of their importance been sufficiently widespread at the time. Both of these were in the possession of the enemy: namely, the central target-bearing indicator with the follow-the-pointer system and the plotting table. Our target-bearing director, without which the battle could not have been fought at all, was only a half measure. The possession of such a central target-bearing indicator would have immeasurably improved the situation for the German fleet in the critical hours between 8 and 9.30 p. m. The plotting of the enemy course and speed is of the greatest importance. It was entirely impossible to follow the continuous changes of course made by the enemy during the first hours of the action by estimates alone, especially when the visibility conditions became poorer. When the enemy is three-quarters hull down there can be no possible estimate made of the enemy speed.

With all of the excellent training of our gunnery officers in rapid observations and adjusting the rate, we had built up our system of gunnery too much on mental labor and the possibility of making estimates. Against all efforts to make the mental labor more mechanical the objection was raised on all sides "Not so much technical apparatus which will fail in battle." No, the human brain tires and finally makes mistakes, the machine never. Calculations which can be carried out mechanically in a simple manner should not be added to the mental burden in the stress of battle. The gunnery officer has enough to do if all of the computations which may be made mechanically are sent to him continuously from one central calculating station. Finally, such data is also required at other stations throughout the ship. The difficulties of making this in present-day naval engagements are too great to neglect any advantage which may be derived from the proper subdivision of the labor and the employment of mechanical methods of calculation.

That the English Navy was not the only foreign navy which differed from us in this respect may be seen from the fact that the American naval officers could only laugh at the antiquated fire-control system of the British Navy when they inspected it for the first time at Scapa Flow in 1917.

The recognition of the German superiority of fire which the enemy must grant willy-nilly, was not due to superiority of our fire-control system, which they so much like to claim, but the better performance and attributes of the personnel.

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OFFICE OF NAVAL INTELLIGENCE
NAVY DEPARTMENT
Washington, D. C.

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The material for the BULLETIN is largely derived from service sources and its interest and value are correspondingly dependent upon the number and character of the reports received by the Office of Naval Intelligence from our own officers. In this connection the observations of officers afloat are of great value, particularly if the reports rendered are drawn up in accordance with existing intelligence instructions.

While political and economic information is undoubtedly of much use, the collection of military information should come first in the intelligence work of cruising ships.

NOTICE

The contents of this number of the BULLETIN are based upon information received in the Office of Naval Intelligence between October 20 and November 21, inclusive.

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H·M·S· NELSON

CONFIDENTIAL

O. N. I. MONTHLY INFORMATION BULLETIN

VOL. IX DECEMBER, 1926 No. 6

ARGENTINA

A. NAVAL

1. Cruise of Argentine training ship.

[Source: Argentine press]

The Ministry of Marine has received a communication from the Argentine Naval Commission in London stating that the training ship *Sarmiento* has completed her trials after the modernization which the vessel has been subjected to at the Laird shipyards in Birkenhead.

The message states that the trials gave a fully satisfactory result: they were conducted in the open sea in the presence of members of the naval commission and Rear Admiral Ismael Galíndez.

In view of the entirely satisfactory result of the trials the *Sarmiento* has been declared in readiness to initiate her twenty-sixth voyage of instruction. She will sail from Liverpool on the 1st of October, will pass through the Panama Canal to the Pacific Ocean, and after visiting Japan and some ports in Asia and Africa will return to Buenos Aires by the route of the Cape.

The itinerary is as follows:

From Liverpool, October 1; arrive Madeira the 9th, departing the 11th; touch the following ports: Panama, arriving October 31, leaving November 4; Honolulu, arriving November 29, departing December 5; Yokohama, arriving December 25, leaving January 2; Kobe, arriving January 3, departing the 5th; Kure, arriving January 6, departing the 8th; Singapore, arriving January 22, departing the 26th; Diego Suarez, arriving February 14, departing the 18th; Durban, arriving the 28th of February, departing the 2d of March; Cape Town, arriving March 6, departing the 12th; arriving Rio de la Plata (Buenos Aires) April 1.

NOTE. The *Sarmiento* is a square-rigged auxiliary vessel of 2,850 tons with little combatant value. She has been at Lairds for almost a year undergoing a complete overhaul. Midshipmen for the present cruise were taken to her from Argentina in June.—Ed.

2. *Argentine naval program.*

Following a number of sessions in both chambers, the law providing for the modernization of the Argentine Navy has received final sanction. The following are extracts from the law:

ARTICLE 1. The executive power is hereby authorized to incorporate into the navy: (a) Three light cruisers to replace the "25 de Mayo," "Nueve de Julio," and "Patria"; (b) six destroyers to replace the "Mendoza," "Salta," "Rioja," and "San Juan," constructed in France, and the "San Luis," "Santiago," "Santa Fe," and "Tucuman" ordered from German shipbuilders by virtue of Law 6283, the contracts for which were rescinded; (c) river boats requisite to replace the "Andes," "Plata," "Libertad," and "Independencia"; and also auxiliary vessels for hydrographic surveys, maintenance of buoys, upkeep of lighthouses, the present ships being no longer fit for those services.

ART. 2. The executive power is likewise authorized to acquire two groups of submarines, each of three boats, and to commence the construction of the workshops, slipways, and barracks necessary for their repair and maintenance at the Port of Mar del Plata, and to carry out the extensions most urgently necessary at the arsenals of Puerto Belgrano, Rio de la Plata, and the naval bases, so as to be able to meet the requirements of the new services.

ART. 3. The executive power is authorized to assemble war material and to contract for radiotelegraphic stations, antiaircraft artillery, catapults for launching airplanes from ships, and the corresponding aircraft; to acquire safety installations indispensable for the operation of the armament of the battleships, and to repair and put into condition for service the vessels which are still considered of use for the navy. The executive power will likewise have constructed forthwith two vessels adapted for oceanographic studies and for the study of maritime and fluvial fauna and flora. These vessels, for the purpose of the said studies, will be treated as dependencies of the University of Buenos Aires which, in consultation with the Ministry of Marine, shall formulate regulations for their use and maintenance.

ART. 4. In order to meet the cost of all these acquisitions the executive power is authorized to expend 75,000,000 pesos gold.

ART. 5. The expenditure authorized shall be spread over ten years, it being permissible to spend up to 35,000,000 pesos gold in the first three years; 20,000,000 in following three years, and 20,000,000 in the last four years.

ART. 6. The executive power is authorized to encourage the installation of private shipbuilding yards in the country, and to that end it may give bounties up to the sum of 300,000 pesos paper per annum, which will be chargeable against this present law. The shipyard or shipyards established by virtue of these facilities would have preference in the matter of all construction which could be carried out in the country for account of the state.

"La Nación" publishes the following antecedents of the newly sanctioned measure:

The executive power on May 18, dictated a decree at a meeting of the cabinet authorizing the Ministry of Marine to expend up to 35,000,000 pesos paper on the purchase of a variety of elements designed to replace a total of some 15,000 tons of the units of our navy. The executive power estimated that that figure of tonnage was what it would be necessary to eliminate from service by reason of the natural wear and tear of the last 12 years. Prior to the date above mentioned the executive power submitted to the consideration of Congress the project which was definitely sanctioned by both chambers on Wednes-

day. * * * In the meantime, work already started in anticipation of sanction of the law will continue on a perfectly defined plan. The naval commission in Europe will now complete the study of the offers which it should have received for the construction of two light cruisers, two scout ships for destroyer flotillas, two vessels for navigation along the Patagonian coast, and three submarines, all of this to be complemented in due course with the schemes considered most suitable for the development on a large scale of aviation in the navy and likewise the reorganization of the arsenals.

Editorial comment from "The Standard":

As anticipated, Congress has authorized the expenditure of $75,000,000 gold on ships, guns, and warlike assets generally. Though the expenditure is to be spread over a decade, it is still a huge sum for a country with 10,000,000 population and a staggering debt, mostly money borrowed abroad.

The unrepresented taxpayers, whose name is legion, have no remedy. The voice of "the people" as expressed in Congress, is the voice of Mars in his senile decay. We have, perforce, to assent, though we do not agree or concede that the outlay on warlike engines or stores is justified either by necessity or the spirit of the times, which is mostly the spirit of Locarno. During the next 10 years every inhabitant of the nation, old and young, both sexes, will have been committed to an outlay of, roughly, 20 pesos. Let us hope that it will not be more; for, once started, expenditure rarely fails to exceed the limits set by a statute.

We concede that Argentina requires a navy. Her extensive coast line devoid of a single life-saving station calls for vigilance. The specter of anarchy has raised its ugly head in remote districts, and it is capable of doing so again. In order to deal with emergencies as they arise, swift, powerful units are necessary and they should be ever ready.

The action of Congress in placing $75,000,000 gold at the disposal of the Argentine Government may be justified by "information received" and imparted in secret session. But conjecture is already rife as to the possible enemy. The stereotyped declaration, "Argentina is the friend of peace," will be trotted out, but light cruisers, destroyers, arsenals, mother ships for airplanes, and naval bases for battleships are all too suggestive of the ominous. Argentina has frequently and very recently declared in regard to Brazil and her neighbors generally, "Everything unites us, nothing divides us!" But, those declarations notwithstanding, Brazil will see in this heavy vote for war materials and the secret manner in which it was agreed to a legitimate excuse for following Argentina's example. And when Brazil does follow the lead the local militarists will again become clamorous for more "preparedness."

A few days ago we suggested, in view of the very satisfactory trials of the modernized *Sarmiento*, built and refitted in Birkenhead, that when the new units were being ordered British yards might be remembered. They will be, so far as to ask them for tenders, and probably no further; for, just now conditions make it difficult for England to tender with any degree of success. Moreover, it is easy to understand that where the money is borrowed the orders will be placed. From the day that a vessel's keel is laid down the type or plan of that vessel begins to respond to the inexorable process of evolution, so that by the time she is launched the vessel, especially the war vessel, is, in a sense, if not literally, obsolete. But she has to be paid for though obsolete, and in any case the investment is nonproductive. For a young country deeply in debt these considerations should count, but in Congress they count for little or nothing.

NOTE.—All of the vessels to be replaced under above program are obsolete torpedo boats, gunboats, monitors, or cruisers mostly dating from 1875 to 1895. The new cruisers will probably be about 5,000 tons each, while the submarines, the first in the Argentine service, will be small. The "Standard," quoted above, is an English owned and edited daily of Buenos Aires, which caters to and reflects the English attitude on all subjects. But that Argentine's action complicates the already delicate situation existing between Chile and Peru and raises the simmering question of Argentine-Brazil rivalry is indicated in the following article.—ED.

---

3. *Brazilian and Chilean press comments on Argentine naval acquisitions.*

The press of Brazil has commented caustically on the proposition of the Argentine Government's intention to purchase new naval equipment, saying that if Brazil had signified the same plan in 1923 when she agreed to the South American armament program the whole world would have been upon her. She has remained unarmed and has purchased a single submarine with fear and trembling, while Argentina suddenly publishes her intention to buy cruisers, submarines, antiaircraft equipment, to renew and repair all her old equipment and naval stations. She (Brazil) states that there is no apparent reason for the program of Argentina at this time, and resents the expenditure of such an immense sum in sea and land defense, saying that the bellicose and warlike attitude of Argentina is unmistakable.

The press of Chile commends Argentina on her plan to buy new naval equipment and renew her old. The progressive attitude of Argentina is pointed out as a good example for Chile. The new naval acquisitions of Peru are mentioned as threatening the peace and safety of Chile, and the bill now before Congress in the latter country is strongly urged for passage.

NOTE.—Aspects of the Peru-Chile antagonism were given in the November BULLETIN. According to the above, this action of Argentina strengthens the hand of Chile in her endeavor to increase her armament and hence is welcomed by her. The submarine for Brazil mentioned above, was laid down in Italy in October, 1925, and is of 1,308-1,854 tons displacement.—ED.

B. AERONAUTICAL

1. *Argentine dirigible "O 2."*

The Argentine Navy has at present but one dirigible, semirigid, the type, capacity, dimensions, and data of which are as follows:

Length: 173 feet; diameter, 56½ feet.

Capacity: 127,119 cubic feet.

Motors: 2 Colombo of 110 horsepower each.
Type: Cianpiano (Rome), built in the year 1919.
Speed: Maximum, 56¼ miles per hour; cruising, 46⅞ miles.
Radius of action: 1,250 miles.
The dirigible is known as *El Plata* and carries identification mark "O–2."

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2. *Possible purchase of two airplane carriers.*

[Source: Argentine press]

Information has been received that if Congress votes the necessary funds for additional naval ships and equipment, for which 75,000,000 gold pesos have been requested, the navy will buy one or two airplane carriers which are necessary for the aerial defense of the coast, and which will give greater efficiency and radius of action to naval aviation.

Conferences have been held with the Minister of Marine by the heads of the aeronautic service relative to this matter, which included information regarding the latest advance in the development of this arm of warfare.

BOLIVIA

A. AERONAUTICAL

1. *Bolivian air service.*

The Bolivian air service is composed of about six active pilots.

There are two factions—one led by Maj. Belboa B. Bernardino, the present commandant at the aviation school, who took his pilot's training in Santiago, Chile, about 1919; the other led by Capt. Raul Vavgus Guzman, who studied aeronautics on the Continent and aspires to be commandant of the school.

The only airplanes seen were a Maroine monoplane (training plane) with 120 horsepower LeRhone engine, and a Caudron training plane with a 180 horsepower Hispano-Suiza engine. These were in the civilian or small hangar.

I was not permitted in the large hangar but was assured that there were five new Fokker observation planes (CO5) with 12 cylinder V 450 horsepower Hispano-Suiza engine. These are very good, modern planes, but had not been flown due to the failure to send some important part—I believe a compressed-air bottle for the air starter.

The field is 600 meters by 800 or 900 meters and is on the altoplano above La Paz at an altitude of 4,100 meters.

The civilian pilot, who is also chief instructor, is Hans Haeberly, and the chief mechanic is F. Meyer. Both claim to be Swiss.

In connection with the same subject, the following article is copied from the "South Pacific Mail":

Following upon the recent criticism with regard to the procedure of the National School of Aviation, it is now announced that, having passed the necessary medical and professional examinations, 16 new pupils have been chosen for the second course of pilot training, 8 being military pupils and 8 civil reservists.

Yesterday all the new pupils received their "air baptism," being taken up by Maj. Hans Haeberly, the Swiss pilot contracted by the Bolivian Government for the aviation school.

It is hoped that three new machines will be arriving shortly from France for the aviation school, with which in addition to the recognized experience and expert preparation of Major Haeberly, the country will have the satisfaction of having the newly entered pupils completely trained as first-class airmen.

NOTE.—Bolivia has no aircraft factories. In addition to the above planes, she is reported as having 11 Avro, 10 Bristol, 9 Martinsyde, 2 Fiat, and 2 Bréguet biplanes, most of them however, probably being old models.—ED.

BRAZIL

A. NAVAL

1. New commander in chief.

On October 6, 1926, the President of the Republic decreed that Rear Admiral Carlos Frederico de Noronha would be relieved as commander in chief of the Brazilian Fleet and Rear Admiral Augusto Carlos de Souza e Silva appointed chief of the Brazilian Fleet. He is a possible candidate for Minister of Marine in the new administration of President Washington Luiz.

Admiral Souza e Silva has for many years represented Brazil on foreign missions and was up to the time of Brazil's withdrawal from the League of Nations the Brazilian naval representative. From the best opinion amongst Brazilian naval officers, his appointment as commander in chief of the Brazilian Fleet is not considered to be for the best interests of the fleet in view of his lack of experience afloat.

Admiral Souza e Silva is generally known to be pro-British in his tendencies.

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2. Naval base at Cobras Island, Guanabara Bay, Rio de Janeiro.

A visit was recently made to the new naval base under construction at Corbas Island in Guanabara Bay at Rio de Janeiro, Brazil.

A new graven dry dock, sea walls, and shop buildings are being constructed here for the Government by the Companhia Mecanica e Importadora de Sao Paulo. The technical and engineering staff of the contractor are mostly Germans. The work is being done on a plus-cost basis. The contractor is allowed a profit of 15 per cent on all labor expenditures and 17 per cent on all material expenditures. About 2,000 men are now engaged on the work.

Dry dock.—The dock has been named *Arthur Bernardes*, in honor of the present President of Brazil. The following are the principal dimensions:

	Meters
Length	251.88
Width of entrance at top	35.108
Width of entrance at bottom	32.574
Depth over sill at mean low water	10.50
Depth over sill at mean high water	12.30

The excavation of the dock practically throughout is from solid rock. About 25 per cent of the excavation remains to be done. The upper end is completed, including the granite facing. The caissons for the entrance of the dock are in place, so that the work of completing the dock should now progress with comparative rapidity. It is proposed to install either cast steel or granite keel blocks for the lower courses. It is estimated that the dock may be completed by the end of 1927.

Sea wall.—The Island of Cobras (Ilha das Cobras) is a high, rocky island on the central part of which the marine barracks and the naval hospital are located. These will remain in the new project. The west end of the island also has at present two small dry docks and a large naval store house. To provide sufficient flat land for the construction of shops it is proposed to build sea walls beyond the present shore line on the northeast and south sides of the island, and to back fill by dredging. The sea wall is to be constructed in sections, using reinforced concrete caissons which are built on land, launched, towed to their final location, and sunk over a foundation prepared by a movable caisson. A considerable number of sections for the sea wall have been completed and are now afloat awaiting the completion of the foundations. The two caissons forming the sea wall at the entrance to the dock were successfully placed recently. The sea walls as now projected will provide a linear extension of about 3,000 feet for battleships and other large vessels and about 3,000 feet for smaller craft. This in itself will be a very great advantage to the Brazilian Navy as all work on ships must now be done with the vessels anchored in the bay. When the new arsenal is completed there will be ample room to bring alongside all vessels undergoing repair.

Building slip.—The project calls for a building slip on the south side of the island of sufficient size to permit the construction of ships up to about 10,000-ton cruisers. Traveling cranes for the dry dock are being given such characteristics that they will be suitable for use at the building slip.

Shops.—Several shops of the navy yard are now located on the Ilha das Cobras. These will, however, disappear in the project. The plans call for sufficient area to erect shops of adequate capacity to care for all of the repairs of a navy about 50 per cent larger than the present navy. The plans for the shops and their equipment are now under way, but no work has as yet been started. The erection of buildings will have to await the completion of the sea wall and back filling in most places.

Connecting bridge.—One of the main problems in connection with the building of a large navy yard on the Ilha das Cobras is the present difficulty of tran-porting workmen back and forth. The construction of a roadway bridge between the mainland and the island is contemplated. If a bridge is constructed at all, it will probably also carry street-car tracks to the island. Considerable opposition is likely to develop to building the bridge because it will interfere with the entrance of merchant ships to several slips. The naval authorities maintain that merchant ships can, with practically the same facility, reach their slips by approaching from the south side instead of from the north side of the island.

Probable date of completion.—The Government officials estimate that the dry dock will be completed by the end of 1927; the sea wall and back fillings by the middle of 1929, and the shops complete, with their equipment, by the end of 1930.

In conclusion, it is believed that the matter of greatest interest in the construction of the new Brazilian navy yard on Cobras Island is that Brazil is entirely dependent upon foreign engineers having, so far, not developed any engineering talent sufficient for the construction of projects of this nature.

B. AERONAUTICAL

1. Reorganization of air service.

A bill has been put before the Senate by the marine and war committee to create a division of military aviation, using as a nucleus the existing military aviation forces. The plan calls for a five-year period of execution, beginning with the year 1927, and a total expenditure of $5,000,000, and for the establishing of schools of aviation and airdromes. It specifies also, as a natural complement to military aviation, the organization of antiaircraft forces, and authorizes full cooperation between the military and naval air forces. It calls for

the establishment in the Federal capital of a superior council of military aviation for the purpose of studying all problems connected with the service and correlating the activities of the naval and the military air forces.

An amendment to the bill proposes the creation of a center of medical aviation in Rio de Janeiro and the later creation of centers in other parts of the country, and authorizes the Government to send a commission of medical military specialists to Europe and North America to study the organization and working of similar organizations.

NOTE.—The Brazilian military and naval air services are attached respectively to the army and the navy as in our service. The military personnel have been trained largely by the French, while the naval personnel are being organized by our naval mission. The naval air service has about 100 planes, old and modern.—ED.

CHILE

A. AERONAUTICAL

1. Airplane contract.

The Ministry of War has signed a contract for the prompt delivery of 9 Curtiss pursuit planes, type "Hawk."

This action is the final outcome of the previous contract for 14 planes which was canceled some months ago when the new constitutional government came into power.

It is believed that the order will be increased, possibly to 30 planes, but for the present a delay is desired in order to compare the Curtiss with the Wieholt pursuit planes already under contract and due for delivery in a few months.

Lieutenant Doolittle, United States Army, who was on leave in Chile demonstrating the Curtiss *Hawk*, made a great impression on the war minister and the army in general, especially the air service. It was a revelation to them of what could be done with such a plane in the hands of an experienced pilot. The sturdiness of the plane was demonstrated by his flight to La Paz, Bolivia, and return, followed in a very few days by his nonstop flight over the Andes to Buenos Aires.

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2. Flights of Lieutenant Doolittle, Air Service, United States Army.

At about 5 a. m., Thursday, August 18, Lieut. J. H. Doolittle, Air Service, United States Army, took off from El Bosque for his

projected flight to La Paz, Bolivia. Lieutenant Doolittle was in this country on leave demonstrating the 430-horsepower Curtiss *Hawk* pursuit plane.

The distance to Antofagasta is 700 miles, and Doolittle hoped to make that place by 11.30 a. m., stay about one-half hour for refuelling and then hop off for La Paz.

He encountered strong head winds in the neighborhood of Copiopo and fog for a great part of the flight. For these reasons he was unable to keep up to his schedule and was forced to land about 75 miles south of Antofagasta. He was fortunate in finding a safe landing place at the Nitrate Oficina of Bonasort. Here he was quickly supplied with sufficient gasoline for the run to Antofagasta. Taking off at Bonasort, he landed at Play Blanca, the landing field of Antofagasta, at 1.05 p. m.

It was then too late to continue to La Paz that day, as he could take no chances on arriving at La Paz after dark, so that stage was postponed until the next day.

At 10 a. m., Friday, Doolittle left for La Paz, arriving at 3.40 p. m., without trouble. He followed the coast to Arica and then the railroad to La Paz. He stated that by lengthening his route a little so as to avoid certain altitudes, he only ascended to 4,500 meters in crossing the Andes. Without the detours he would have required 5,000 meters.

On Saturday he made an exhibition flight and on Sunday at 3 p. m. started for Antofagasta via Orura southeast of La Paz. He arrived at Orura at 5 p. m., was supplied gas by the local officials and put up for the night. On Monday morning he made the flight to Antofagasta in three hours, across the salt marshes.

On landing at Antofagasta an element in the fuselage was cracked, due to inequalities in the ground, which necessitated a delay until Wednesday the 25th.

At 9.20 on the 25th he left for Santiago, arriving at 2.35 without incident.

Doolittle's flight was greatly facilitated by the cooperation of the Chilean authorities, national and local. The Minister of War had been especially impressed by his flights around Santiago and had telegraphed to every army and carabinero post throughout the north to keep a sharp lookout for him and to render all assistance possible.

The personality and ability of the pilot, as well as the quality of the machine, have made a great impression on all hands.

After some delay, due to nonreceipt of the Argentine permission, Doolittle flew to Buenos Aires. The distance is about 700 miles, and counting on a favoring wind he expected to make the trip in 5½ hours.

Leaving at 7.41 a. m., Friday, September 3, 1926, he made a nonstop flight to Buenos Aires, arriving at 3.50 p. m.—time, 7 hours and 37 minutes. Actually, he ran out of fuel and had to land 6 kilometers short of the regular field at La Palomar. There he obtained more gas and continued.

The weather conditions were favorable and it is believed that the delay was caused by his taking the wrong branch of the railroad over a certain town in the Argentine, necessitating a return to that town when the error was discovered. This is deduced from reports of his flight from points along the line.

There have been some 17 flights between Santiago and Buenos Aires, but this is the second nonstop, and the first in a pursuit plane.

Several exhibition flights were made over Buenos Aires and Montevideo.

CHINA

A. NAVAL

1. Manchurian naval strength.

Convinced from recent experiences that, though fairly secure in Manchuria, it may not be safe from attack nor extend its power south of the wall if reliance is had only upon its land forces, the Manchurian party has formed a definite plan to create a naval force.

In discussing this recently, Yang Yu-ting, the able chief of staff of the Manchurian army and a leader in the group that determines Manchurian policies, expressed the belief that with such a force and a secure base in Manchuria the Chinese coast and ports south of the wall could be placed under complete control.

Such naval forces as now exist in China are utterly unreliable. The personnel is largely, if not exclusively, drawn from Fukien The matérial is old and in poor condition. Both men and ships are for sale to the highest bidder and the latter may not be sure of his bargain, as unless all ships and crews are on one side they are reluctant to fight each other because of their common origin. Thus at present they are little more than blackmailers, extorting retaining fees from the various leaders on threat of attack, and failing to obtain money in this way not hesitating to place small ports under forcible levy. Yang Yu-ting has in mind the creation of a navy of Manchurian personnel and of discipline and training.

As a first step a naval college has been established at Hulatso, known as the North Eastern College and the present fleet, divided into three divisions, based on Tsingtao, Hulatao, and Newchwang;

Port Arthur being used sometimes for the training vessels. The three divisions are as follows:

NORTH EASTERN SEA FLEET

Name of ship	Description	Displacement (tons)	Speed	Torpedo tubes	Main armament (number and caliber)	Secondary armament (number and caliber)	Additional armament (number and caliber)
Chen Hai	Cruiser	2,708	13	No.	2, 4.7-inch	4, 7.5 cm	
Wai Hai	do	2,436	13	No.	2, 4.7-inch	4, 7.5 cm	
Ting Hai	Gunboat	1,100	13	No.	6, 7.5-inch	No	
Fei Pung	Destroyer	127	26	1	2, 3-pounder		

NORTH EASTERN RIVER FLEET

Kiang Hung	Gunboat	550	13		2, 4.7-inch	4, 3-inch	
Li Chi	do	266	14		2, 3-inch	4 m. g.	
Li Sui	do	170	14		2, 3-pounder	4 m. g.	
Kiang Ping	do	240	12		2, 3-pounder	4-inch	
Ki Kee	do	250	12		2, 3-pounder	4 m. g.	
Kiang Ting	do	120	12		4 m. g.	4 m. g.	
Kiang An	do	250	12		2, 3-pounder	4 m. g.	

CHIHLI GULF FLEET

Hai Chi	Cruiser	4,300	24	5	2, 8-inch	10, 4.7-inch 12, 4.7 cm	4, 3.4 cm. 6, 7 mm. M.G. 1, 4 cm. AA. 1, 3 cm. AA.
Hai Chun	do	2,950	19.5	1	3, 15 cm	8, 10 cm	2, 6 cm. 4, 4-pounder. 3, 8 cm.
Chu Wu	do	2,600	20	2	2, 6-inch	4, 4-inch	3, 3-pounder. 2, 3-pounder. 2, 1-pounder.
Yung Hsiang	do	780	12.5	No.	1, 10 cm	1,7 cm 4, 3-pounder	2, 1-pounder
Chow Yu	do	780	13	No.	2, 12 cm	5, 7.5 cm 4, 3-pounder	2, 1-pounder.
Tung An	Destroyer	390	32	2	2, 12-pounder	4, 3-pounder	
Hwa Chu	Cargo boat	9,000					

DENMARK

A. NAVAL

1. Organization and activities of the Danish Navy.

The plan of partial disarmament advocated in Denmark last year which was to make the navy consist of 34 submarines and torpedo boats calling for an appropriation of 10.4 million kroner found little sympathy and seems to have been abandoned. Even if there can be no question of an extension of the navy (at present there are two submarines under construction), it is nevertheless deemed necessary to maintain the present quota of ships in commission in the interest of the country. It is known that the Danish territorial waters are of such a nature as to make very effective military operations possible for a small navy, which could prove very uncomfortable for large naval powers.

The navy, including officers, numbers on an average of 3,000. Under the 140 officers, there are one vice and two rear admirals, 9 captains, 3 commanders, 21 lieutenant commanders, 22 lieutenants. Prince Axle is numbered among the lieutenant commanders and Prince Knud, the King's youngest son, is among the lieutenants Rasmussen is the minister of defense, Vice Admiral Konow is the inspector of the fleet; Rear Admiral Scheel, chief of the station; Capt. Topfoee Jensen is chief of the coast defense, and Rear Admiral Amdrup is chief of the squadron.

The following vessels are in commission: 1 armored cruiser, 9 torpedo boats, 12 submarines, 3 mine layers, 11 coast guard ships (torpedo boats). In reserve: 1 armored coast ship, 2 cruisers, 3 torpedo boats, 2 submarines, 1 mine layer, 7 guard boats. For special purposes as needed: 4 ships for fishery protection, 2 survey ships, 1 repair ship for submarines, 1 tender, 1 royal yacht, 1 station ship for submarines and flying boats. Under construction: 2 submarines, flying boats, and airplanes.

Owing to the limited appropriations, the ships are commissioned for certain limited manoeuvers, as follows:

(*a*) The Baltic squadron, consisting of a protected cruiser (leader), 2 cruisers, 3 submarines, 3 torpedo boats, 1 mine ship (Rear Admiral Amdrup, chief of squadron).

(*b*) The training division, consisting of a ship for protection of fisheries (leader), 6 torpedo boats, 2 mine sweepers, 1 tender (Commander Karttung, chief of this division).

(*c*) The training squadron, consisting of 1 protected cruiser (leader), 9 torpedo boats, 7 submarines, 3 mine sweepers, 1 repair ship, 1 mother ship, 1 tender (Vice Admiral Konow was chief of this division last year).

Recently the two cruisers *Hejmdal* and *Geiser* visited Southampton, Leith, Barcelona, Gibraltar, Plymouth, and Vlissingen. The three submarines *Bellona*, *Flora*, and *Rota* left for a cruise to Holland the beginning of June, visiting Amsterdam. The fishery boat *Diana* visited Rotterdam in May. The beginning of June, the King and Queen, accompanied by their youngest son, left on the cruiser *Niels Juel* for a trip to the Faroe Islands and Rejkjavik in Iceland.

NOTE.—The two submarines under construction are building in Copenhagen. They are of 325/380 tons, speeds of 16/9 knots. They should be completed this winter—ED.

B. AERONAUTICAL

1. Rohrbach Airplane Works.

A visit was recently made to the flying field of the Rohrbach Airplane Co. at Kastrup, just outside of Copenhagen, and also to the

Rohrbach assembling plant at Copenhagen. This flying field consists of a corner of the Government flying field, which is rented by the Rohrbach Co. and on which they have at present one hangar. Mr. Rohrbach said that they were going to erect a larger hangar there. In the hangar were the two flying boats which had been entered for the sea flight competition at Warnemuende, but which did not take part in the sea flight. One of these planes arrived at Warnemuende on July 18 from Copenhagen, having been just completed there and having had only one-half hour's trial flight in the air before starting. This plane did not succeed in getting its motors properly tuned up and was therefore withdrawn from the competition. The other plane arrived at Warnemuende several days before the commencement of the trial flights there.

During a trial flight one of the propellers burst, damaging the other propeller and piercing the hull of the fuselage. The pilot succeeded in alighting on the water and was towed back to Warnemuende. The damages were repaired within three days and the machine was ready again for further trials. These were prevented, however, by very bad weather conditions and also by the fact that further motor troubles were experienced.

Mr. Rohrbach told me that he was using B. M. W. motors on these planes against his own judgment, having been prevailed upon by the German Air Ministry to do this. He said that he afterwards was very sorry about it and that he would stick to foreign motors in the future as he considers German motors are considerably behind foreign motors in development. Several other authorities gave me similar information about German motors.

The motive power on these two planes has been changed to a pusher type. This is regarded by Mr. Rohrbach as much more efficient for an airplane, who also claimed that the method developed more power.

As stated above, these two planes did not take part in the long-distance flight, but they did take part in the seaworthiness test and performed most favorably. Mr. Rohrbach informed me that these two planes had been sold to a flight school on the island of Sylt for the training of commercial seaplane aviators.

Rohrbach has changed the bottom of his flying boat to a V shape. The bottoms of the floats are similarly shaped but not so pronounced.

This form is much more satisfactory than the previous flat bottom. He will continue to use the new shape and also intends to give much more V shape to the pontoons.

On the flying field was a one-seater pursuit plane for Turkey which had just been finished and was having flight tests. This plane was flown for me and performed all sorts of flying stunts. It has one

B. M. W. motor of 460 horsepower, 12 cylinders supercharged. The plane is marked ROFIX.

In the assembling shop there was being assembled one of the large 28-meter bombers *RO-III-a* for Turkey. This is the second one for Turkey; the first has just been delivered. This plane bears the serial building number 14, which would agree with previous information received on this subject to the effect that 12 have been delivered to Japan, another to Turkey, and this one also for Turkey. As previously reported, this plane has two Dietrich Lorraine motors, each of 450 horsepower. They will have two sets of twin Madsen machine guns, and will carry 3,000 kilograms of bombs under the wings; six at 500 kilograms or a larger number of smaller bombs to carrying capacity. The wings of these two bombers are on top of the fuselage. On the ones delivered to Japan, the wings were attached to the sides of the fuselage. His new method is considered easier to attach and more secure.

Mr. Rohrbach told me that he has no further orders for Japan and does not give them any information regarding his latest improvements. In the shop was also being assembled the second pursuit plane for Turkey, similar to the one that was flown for me on the flying field. The wings for a third pursuit plane were also being assembled, but I could not find out for whom this plane is intended.

At the present time there are employed 180 men, working in two shifts—a day shift of 140 and a night shift of 40.

One of the engineers now with Rohrbach was formerly with the Fokker Co. He told me that he had lived in Russia for two years in charge of the Fokker assembling plant there and that the Russians had bought about 400 Fokker planes and about 120 Junker planes. In his opinion the Dornier flying boat is too low in the water. The Dornier people told me that they thought that the Rohrbach was too high out of the water. Each plant has different ideas on the subject.

FINLAND

A. NAVAL

1. Submarine contract.

The contract, as finally awarded to Crichton-Vulcan, Abo, Finland, calls for one submarine:

Displacement	450 tons.
Length	63 meters (206.64 feet).
Surface speed	13.5 knots.
Submerged speed	8 knots.

Contract, price, about, Finnish marks 28,000,000.

To be built from plans furnished by "N. V. Ingenieurs Bureau voor Scheepsbouw," of The Hague.

The Electric Boat Co. made strenous efforts to obtain this contract, but was beaten out by the German interests. The Electric Boat Co. originally bid Finnish marks 29,607,000, which later was reduced to 29,000,000, and finally to 27,750,000. The Germans started out at Finnish marks 31,500,000; reduced in April to 29,500,000 and in September to 28,000,000. The contract provides that the Finnish Government may use the plans for future construction without payment of royalty.

A representative of the Electric Boat Co. has stated that they reduced their price as low as possible so as to force the Germans to reduce to such a price that they could not make a cent.

Mr. Blum, the German contractor, has stated that this price meant practically no profit.

The Electric Boat Co. was handicapped from the start by the fact that the Finnish naval committee included two ex-German naval officers. One, Captain Bardenbach, who commanded the German submarine base at Zeebrugge during the war, and after the war was chief of a mission to Argentina, and for the past three years acting as naval advisor to the Finnish Navy. The second member is an electrical engineer from the "Germania Werf" and, it is believed, also a member of the staff of the "N. V. Ingenieurs Bureau voor Scheepsbouw."

NOTE.—Details of the above submarine and the Finnish building program were given in the September BULLETIN. Proposals were originally to be submitted for one 400 and one 100-ton boat. American, English, German, French, Italian, Danish, and Sweedish firms were competing. ED.

FRANCE

A. NAVAL

1. Propelling machinery of the "Duguay-Trouin."

The propelling machinery of the *Duguay-Trouin* has been constructed throughout in the works of the Ateliers et Chantiers de la Loire, and consists of four independent sets of Parsons steam turbines, each driving one propeller shaft. These four sets of turbines are located in three engine rooms. The forward engine room contains the two sets of turbines driving the wing propeller shafts, these sets being arranged symmetrically on each side of the center line of the ship. The turbines which drive the starboard inboard shaft are located in the intermediate compartment, while the set which drives the port inboard propeller shaft is in the after compartment.

Each set of turbines includes for ahead a high-pressure turbine which exhausts into a low-pressure casing, the latter exhausting into a condenser carried below the lower half of the turbine casing. Double helical gearing of the single-reduction type is provided for each shaft. Forward of the high-pressure turbine a cruising turbine is arranged, this unit driving the shaft of the high-pressure turbine through single-reduction gearing. The cruising turbine consists of a single impulse wheel, and is only used for running ahead at low speeds, a suitable disconnecting coupling being provided between the gearing driven by that turbine and the shaft of the main high-pressure turbine. The high-pressure turbine is of the single-flow reaction type, while the low-pressure turbine is of the double-flow reaction type. Steam is admitted to the center of the turbine, and exhausted at the ends, so that end thrust is almost completely balanced, and dummy pistons, which are fitted to the high-pressure turbine spindle, are rendered unnecessary. At the forward end of the low-pressure turbine a high-pressure astern portion is arranged. This is provided with impulse and reaction blading, and it is designed to exhaust direct to the condenser, no low-pressure astern turbine being provided.

Before entering the turbines the steam passes through a control gear, which includes an ahead valve and an astern valve, both controlled by the same wheel. It then passes through a distribution box fitted on the high-pressure turbine casing, this box comprising a set of four valves, also controlled by the same handwheel. The first valve controls the inlet of steam into the cruising turbine, corresponding to one-eleventh of the maximum power and to a speed of about 16 knots; the second valve controls the steam inlet to the first high-pressure expansion stage (corresponding to one-fifth of the maximum power); the third valve controls the steam inlet to the third high-pressure expansion stage (corresponding to one-half of the maximum power); and the fourth valve controls the steam inlet to the fifth expansion stage of the high-pressure turbine (corresponding to the maximum power).

For astern running, steam comes from the control gear and is led directly to the low-pressure turbine. There are two directly controlled valves fitted in the inlet pipe to the astern nozzles which enable steam to be admitted to a variable number of nozzles, according to the number of boilers working and hence to the quantity of steam available. The wheel of the control gear and that of the distribution box are fitted on a control board, which also includes all control gear for the hand regulation of the throttle valve, and of the discharge valve to the condenser.

Each condenser is equipped with three air ejectors of the Maurice LeBlance two-stage type. Each condenser is provided with two

air pumps, driven by geared turbines, each of these pumps being sufficient to insure the maintenance of a sufficiently high vacuum in the condenser for low-speed steaming. The circulating pump for each turbine is also driven by a geared steam turbine.

Steam is supplied to the turbines by eight oil-fired water-tube boilers of the small-tube type, working at a pressure of 18 kilograms per square centimeter (256 pounds per square inch). Each boiler has a heating surface of 1,100 square meters.

NOTE.—The *Duguay-Trouin* is one of the three light cruisers recently completed. They are of 8,000 tons, mount eight 61.1-inch C. L. guns, have a designed horsepower of 100,000 and a speed of 34 knots. Further notes on these vessels may be found in the August and October "Bulletins."—ED.

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2. Cruise of new French naval units.

The Minister of Marine, in keeping with his policy of "sailors at sea," has just announced another cruise of a division composed of the following new units:

Lamotte-Piquet	Light cruiser (flagship).
Duguay-Trouin	Light cruiser.
Chacal	Destroyer leader.
Tempete	Torpedo boat.
Simoun	Do.
Bourrasque	Do.
Souffleur	Submarine.
Narval	Do.

Rear Admiral Pirot will command the division.

The following ports will be visited on the cruise: Brest (port of departure), November 10, 1926; Lisbon, Casablanca, Agadir, Teneriffe, Dakar, and Konakry, returning to France about December 20th.

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3. Reception of French squadron in Copenhagen.

A French naval division consisting of three destroyers and two submarines, arrived in Copenhagen recently from Riga and remained for four days. During their short stay here a number of entertainments were organized in their honor by the Danish authorities and by Danish individuals and corporations. Several of these entertainments were given exclusively for the French sailors. The officers were entertained, in addition to the official entertainments, by automobile rides in French cars to neighboring places of interest, and by banquets at various restaurants and performances at the theaters. The utmost cordiality appears to have been shown on all of these occasions.

The local press in its comment on the French naval visit has expressed the highest eulogies for France. The conservative paper,

"Nationaltidende" declared that "When it is Frenchmen whom we are about to receive, there is a greater warmth in the tone, a more sincere cordiality in the expression with which we greet them than for any other nation."

No doubt something must be discounted from these articles in view of the occasion on which they appeared, but it would seem nevertheless to be undoubtedly true that there is a deep and thoroughly sincere liking for France and the French here.

Some of this liking is traditional and political in origin, going back to the pro-Danish attitude of France in 1864 during the Schleswig-Holstein war and culminating with the aid given by France in the return of a portion of these Provinces through the treaty of Versailles. Some of it, however, has been fostered by the vigorous propaganda which, especially since the war, has been carried on in Denmark by the French Government. The propaganda is often rather obvious and is sometimes spoken of somewhat derisively by people here. Nevertheless, to a great extent, it is effective in making France and French intellectual and commercial products well known and appreciated in Denmark. One of the organs of propaganda is the society called the "Alliance Francaise" which has rooms in Copenhagen and a membership here of some twelve hundred people and a number of branches scattered throughout the country. This society is under the patronage of the French minister and organizes monthly reunions at which from time to time French artistic and literary men of distinction, sent out under French governmental auspices, give lectures. French patriotic societies, assisted by the French Government, also send to Copenhagen occasionally French musicians, who give concerts, and collections of French paintings and engravings which are shown at special local exhibitions. This policy, as is well known, is carried on by the French Government in a number of other countries.

NOTE.—The naval units referred to comprised the French squadron which makes an annual summer cruise to the Baltic of about two months' duration.—Ed.

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4. Statements of the Minister of Marine.

The following extracts are taken from an interview between the Minister of Marine and press representatives on the occasion of the French fleet putting to sea for fall maneuvers:

The grand maneuvers have commenced; cruisers, destroyers, torpedo boats, practically all of the latest type, left Toulon accompanied by the two squadrons of airplanes. The fleet will cruise for three weeks in the Mediterranean during which time visits will be made to Corsica, Algeria, and Morocco. No one will now be able to pretend that the Navy is asleep; to the contrary, everyone will see it in full action.

The war taught us that we have less need of capital ships than of light and fast units. Such lessons, gained from experience, guided me in drawing up the building program which I now find, upon my return to the Ministry of Marine in the course of realization.

The new units of the fleet, light cruisers and destroyer leaders, built within the limits of the Washington agreement, constitute the last word in naval construction. I can not very well say that ships equally as good have not been built elsewhere, but I can safely affirm that none better have been built.

The new ships will be of little use, however, if it is considered a political demonstration every time they cruise abroad to show the flag and give active training to the personnel.

The sailor at sea—this is my formula; no one can, I am sure, find fault with it. What would become of him if we condemn him to rot in the mud at Toulon or Brest on board obsolete ships which are nothing more than floating barracks? He will lose his love for the seas; his character will become sour; his ears will be open to pernicious counsel and propaganda. That he will wear a blue collar on his blouse is true enough—but he is no longer a sailor.

That men now entering the service should go to sea is of the utmost importance, not alone to foster interest in recruiting but to enable us to train the men within the short period of 18 months. How can we train a sailor in 18 months' time if he has not intensive training under able officers seconded by a good corps of petty officers?

The French flag was no longer seen in foreign waters and people were beginning to think that France was no longer interested in the navy. The recent cruise of our ships in the Baltic, from reports received from diplomatic representatives, was a huge success. We must now continue the good work in the Mediterranean sphere, where the showing of our colors will add to our prestige. The mere announcement of the coming cruise in the Mediterranean caused such enthusiasm in the navy yards that it was impossible to embark all the officers and men who requested duty with the fleet.

With reference to aviation, we had to proceed slowly and in certain cases take a reef in our canvas. The number of various types of machines will be reduced from 16 to 6, in order to permit of standard production. Furthermore, in the future, the president and majority of members of inspection boards for acceptance of airplanes, aviation material, etc., will be naval officers. It is beyond all reason not to have the final word in the acceptance of aviation material left to those who must actually do the flying and risk their lives.

The complete change in the attitude of the thinking public toward the navy is almost beyond imagination. In France, where the army held the front rank for centuries, this change is all the more noticeable.

The complete "about face" from the army to the navy is the constant topic of discussion in the press. The thinking public in France have become reconciled to the fact that the army must give ground to the navy; that the future of France lies on the sea seems to have finally come home to the minds of those guiding the destinies of France. That the army is to be reduced to a skeleton of itself (result of Locarno agreements) is accepted by everyone as a needy and natural outcome, but the mere mention of reducing the navy brings forth the entire wrath of the French press on the economists.

No one item has done more to arouse the French to the importance of their navy than the outspoken statements of the Italian dictator. Indeed, Mussolini has accomplished over night what the French Navy League has been trying to do since 1918.

The present Government is putting the ax to every form of expenditure not absolutely essential—but a kind of a "hands-off" policy is applied to the appropriations for the navy program. The present economy program does not spare the army: Over 6,000 officers will be forced into retirement: sale of over 200 barracks to the various municipalities, etc., while the navy gets off with the closing of two obsolete arsenals, Rochefort and Lorient. These two arsenals have been practically closed since 1918, and do not in any way inconvenience the navy.

From all accounts the 1927 appropriations for the navy, in so far as the building program is concerned, will pass both the chamber and the senate without any undue debate. The French building program, 1922–1929, will, if anything, be exceeded and not reduced. The French are laying down this year four 630-ton coastal submarines which do not appear on the 1926–27 program for the reason that they are classed as part of "appropriation for equipment of coast defense," and not as part of the regular navy program.

NOTE.—The recent "Project de Loi" allows for 48 coastal submarines, in addition to the fleet submarines, and makes these two categories entirely distinct. At present, the French have 38 coastal submarines. The 48 boats are to be divided into six squadrons of eight units each—one squadron for each Naval District. A table of French shipbuilding—actual and projected—was given in the November "Bulletin."—ED.

B. AERONAUTICAL

1. Long-distance naval hydroplane flight.

Two navy hydroplanes, piloted by Lieutenants Bernard and Guilband, left the air station at Berre, October 12, for Tangier, as the first lap on their trip Marseille–Majunga (Madagascar). The trip will be made via the waterways of occidental and central Africa.

To reach Senegal, they will pass via Tangiers, Casablanca, Mogador, le Rio de Ora, Port-Etienne and Mauritanie. The planes will traverse Africa following the course of the Niger, the Benue, the Chari, the Haute-Aubangui and the Congo, thence via lakes Tanganyika and Nyassa.

Arriving at Mozambique they will traverse the Indian Ocean to Majunda, their final destination.

If the season is not too far advanced the planes will return to France traversing the string of small lakes—down the Nile to the Mediterranean via Egypt.

The trip of 26,000 kilometers will take about three months.

One of the hydroplanes is a Cams 37—Lorraine motor 450 C. V.; the other a Loire Olivier—Gnome et Rhone Jupiter, 420 C. V. motor.

No information is as yet available as to what society is financing this undertaking, but it is quite feasible that it is a joint operation of the Aero Construction Companies and the Aeronautique Propaganda Society.

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2. *Precautions against aviation accidents.*

Statement by General Giroe, President de la Commission de l'Armée, as a result of numerous accidents in aviation:

The people of France, who follow with great interest the exploits of its aviators, both civil and military, have been severely shocked this year over the number of fatal accidents in aviation which seem to follow one after another.

What a black tableau! Such is the thought of the anxious families who will soon place their veto to their boy choosing aviation as a career, if we do not put our house in good order.

The statistics of accidents are severe, and demand that we seek remedies with all resources in our power tending to eliminate such accidents. To pretend to suppress accidents in aviation is fantastic. The only way to avoid accidents is not to fly.

The most dangerous form of inattention on the part of a pilot is "the loss of speed." An airplane, being heavier than air, only flies by virtue of its speed. Descending at a speed below the minimum for support, the airplane will crash to the ground. The most experienced pilots have met death due to "loss of speed." Who can affirm that he will not commit this fault? What engineer can affirm not to pass up a signal on some hazy night?

PRECAUTIONS

The success obtained by parachutes, without which we would have registered 20 additional deaths during the year, inspires me to continue the campaign for all possible safeguards for flying personnel.

A complete scale of precautions must be undertaken, or developed, and is at present under consideration.

First. We must suppress the useless death exercises: I mean the combat exercises during which two pursuit planes, or one biplane and one pursuit plane, make sham attacks, performing double summersaults, etc. Individual acrobatic exercises are sufficient for instruction of pilots. Endeavoring to perform combat exercises with two planes pursuing one another is bound to have fatal results. Past performances have proven this beyond any doubt. The Minister of War has undertaken to control these exercises; he must go still further and suppress them.

Second. It is much better to encourage and develop the many useful exercises, which though void of danger give to the personnel proper training in observation, taking off, and landing, as well as necessary military instruction. Short durations of flight over district territory, liaison with aviation centers, exercises in navigation, etc., are the real school of the aviator. Going to the extreme, such as long-distance flying, we enter the field of propaganda, which

is the only influence the aviation industry can bring to bear on aviation progress and construction. In contrast to the aerodromes, cross-country flights show encouraging statistics. Of 20 mortal accidents, 19 took place at the aerodromes—only 1 in cross-country flying.

Third. It is essential that the technical services of the Bureau of Aeronautics be incessantly preoccupied with equipping mechanics with the most up-to-date control apparatus—various instruments, speed indicators, parachutes, fire extinguishers, etc. The parachute after much discussion is finally adopted. Helas! The bravado of the pilots, as well as the military authorities not insisting on its use, often tends toward laxness in this respect. In this connection no more laxness will be tolerated; parachutes will be part of the equipment of all types of planes. It is a question of life or death.

Fourth. Perhaps the secret of much of our sorrow, the motor, soul of the airplane, betrays the two men dependent upon it, and the breakdown of the motor is often the cause of many difficulties and surprises.

To conquer motor mishaps we must have specialists who do nothing but attend to motors.

What do we witness in our aviation centers? The mechanic is taken constantly from his work by a thousand military details; sergeants qualified in aviation are continually transferred to other services.

Our hangars are practically empty. At each visit I make to a center of aviation I ask the question, But where are the mechanics?

The General Staff generously allows from six to seven thousand for a contingent, when eighteen thousand are necessary.

The table of effectives actually allows two mechanics per plane. This is a very small minimum. The contingencies of the service reduce this minimum to six or seven mechanics for each eight planes. The intelligence and devotion of a French soldier is absolutely necessary to "hold out" under such trying conditions.

NOTE.—In 1923, the last year from which figures are available, French aviation casualties were as follows:

a. Military:

Killed	66
Injured	58
Flying hours	156,684
One accident for every 1,910 hours' flight.	
One fatal accident for every 3,197 hours' flight.	

b. Naval:

Killed	12
Injured	3
Flying hours	11,018
One accident for every 734 hours flown.	
One fatal accident for every 918 hours flown.	

—ED.

GERMANY

A. NAVAL

1. The torpedo boat "Moewe."

In accordance with the terms of the Versailles treaty, the displacement of the large torpedo boat *Moewe*, which was launched in March,

1926, the first boat of the new torpedo-boat half flotilla, is 800 tons with a draft of 2.49 meters. The specifications of the boat are:

	Meters
Length over all	87.75
Maximum beam	8.35
Molded depth	5.10

The boat is constructed on longitudinal frames with double bottom and terreplein in the engine and boiler rooms. The foremast is developed as a signal mast while the mainmast is to serve merely as upright support for the boom and the searchlight base as well as rear support for the antennæ. Geared turbines will produce a speed of about 33 knots with a designed performance of 23,000 SHP. The three oil burning boilers are located in separate boiler rooms. The armament consists of three 10.5-cm. 45 caliber (4.1″) guns in center-line position, and the 50-cm. (19.7) torpedo tubes. The crew will consist of about 120 men. The rooms for the officers and deck officers are located in the between-deck abaft. There will be a special room in the bow or stern for the nautical and technical noncommissioned officers. Stokers and sailors will be quartered in separate rooms and will nearly all have cabins for sleeping quarters. Three other torpedo boats belonging to this torpedo-boat half flotilla were launched on June 15 at the Wilhelmshaven yard. The launching was accompanied by a small military ceremony. The torpedo boats were given the names of *Greif*, *Albatros* and *Seeadler* in memory of their celebrated predecessors.

NOTE. The *Moewe* is a sister ship of the *Greif*. In all, 12 of these boats are being built; four have been launched and none completed.—ED.

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2. *Movements of light cruiser "Emden."*

The light cruiser *Emden* having lately concluded its trials has been commissioned as training cruiser from November 1. It will participate in the North Sea Fleet autumn maneuvers, after which it will take on 100 naval corps cadets and prepare for a round-the-world cruise. Meanwhile the former training cruiser *Hamburg* is expected from its world cruise and will take the *Emden's* place in the North Sea Fleet. The cruiser *Berlin* is actually being rebuilt to an up-to-date standard at Kiel and will be commissioned; a second cruiser is under construction and as soon as it is completed the cruiser squadron will be subjected to a complete reorganization.

The division detailed to superintend the infantry training of the naval recruits has started for Wuerttemberg for maneuvers. The small maneuvers will take place in the neighborhood of Urach where

the Wilhelmshaven coast guard were quartered throughout the summer.

NOTE.—The *Hamburg* is just completing a world cruise while the *Berlin* made a South American cruise last winter. These extensive showings of the flag activities of German cruisers are noteworthy. While the *Berlin* and *Hamburg* are obsolete ships, the *Emden* is a modern light cruiser of 6,000 tons mounting ten 5.7'' guns and four 23.6'' torpedo tubes, and with a speed of about 29 knots. Two more light cruisers, larger and of a different type than the *Emden*, are building at Wilhelmshaven and Kiel. These are "B" and "C"—the latter was laid down in July and not much progress has been made as yet.—ED.

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3. Summer cruises of the German Fleet.

[Source: German press]

The practice cruise of the fleet which extended through the Atlantic down to the western part of the Mediterranean was carried out according to schedule. The crews of the war vessels had a very hearty welcome in Spain and the commander of the fleet, Vice Admiral Mommsen (had an audience with the King of Spain, accompanied by a number of high-ranking officers. At his departure the King sent the following telegram:

To the chief of the German Fleet, Barcelona. My hearty greetings to the crews for their splendid appearance and their correct behavior in the different ports which they visited. I send you my best wishes for the welfare of Germany and her fleet.—Alfonso.

Admiral Mommsen answered as follows:

My thanks to your Majesty for the kind words of praise and for the gracious wishes for Germany and her fleet. The crews of the ships under my command, like myself, consider them as a great honor and special recognition and beg to be permitted to express their best wishes for the future of your Majesty and the honorable Spanish nation.—Mommsen, chief of the German Fleet.

The Spanish press was very friendly, "La Region" stating that the behavior of the German sailors in comparison to those of other nations was serious, gentlemanly, and polite.

Truly this manifestation of discipline, politeness, and esteem leads to many conclusions regarding German culture. We know full well that our modest paper does not give the proper measure of weight to our opinion which the behavior of the German men deserves, but it is assured that these lines reflect the feeling of all the inhabitants of Barcelona, quite apart from what their sympathies may have been during the World War.

The behavior of the German sailors was also recognized officially. The chief of police of one of the large cities visited by the German men addressed a communication to the German diplomatic representative in which he stated among other things:

I have the great honor, on the day of the departure of the splendid German squadron, to address myself to your honor in order to express to you as chief of police of this Province the great satisfaction caused by the splendid leadership and model behavior of the entire crew. As not the very slightest complaint was made, this is evidence of the high grade of discipline and training which the admirable sailors of your great nation evidenced at every moment and in all places. We will accord you the greatest admiration. The impression caused among our people will strengthen the bonds of unspeakable friendship which unites your splendid country with Spain. I request you to express this warm praise to all the men who visited us, from his excellency, the admiral, down to the lowliest sailor.

After the Mediterranean trip the battleship *Hannover* visited Helsingfors. The light forces visited a number of Scandinavian ports during June.

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4. Changes in the navy personnel.

(Source: German press.)

With the opening of autumn, it is reported that a number of well-known flag officers of the navy will be retired. There is first the inspector of naval artillery, Rear Admiral Wegener, in Wilhelmshaven, who retires with the rank of vice admiral. Vice Admiral Wegener has recently represented the chief of the naval station who was on leave. He was the senior rear admiral of the navy in point of service, and after the war, reorganized the naval artillery from the ground up. As one of the last measures taken by him, dating from October 1, the former coast defense divisions in Kiel, Wilhelmshaven, Swinemuende, Cuxhaven, Pillau, and Emden will be known as naval artillery divisions. Admiral Wegener took part in the battle of Skagerrak and other operations as first admiralty staff officer of the first squadron. His two sons have also gone into the navy and at present are serving as ensigns. The retirement of Admiral Wegener leaves the post of inspector of naval artillery open which it is reported will be filled by Captain Hansen, the commander of the fleet flagship *Schleswig Holstein*, who, however, will not be appointed to the grade of rear admiral as there are a number of others in the navy list who have priority.

The commanding officer of the line ship *Hessen* stationed in Kiel, Captain Kluepfel, will also be retired with the rank of rear admiral. Kluepfel is an old torpedo-boat officer and became especially known as commander of the *Hessen* through the ice-breaking operations in the Baltic Sea last winter when he brought food to the merchantmen which were frozen in, and freed several of them.

Captain Bobsien, commandant of the fortress at Cuxhaven, is retired with the grade of rear admiral. Before the war he was detailed to the mine-sweeping flotilla stationed at Cuxhaven and also

did service on board the mine cruiser *Albatross*, after which the new destroyer has been named, and which his wife christened. After the war Bobsien was the first commander of the cruiser *Hamburg* of the North Sea forces and then became commandant of the fortress Cuxhaven. His succes-sor in Cuxhaven will be Lieut. Commander Count von Schweinitz, but this post will not yet be filled according to budget provisions.

Captain Kopp, director of the gymnastic course in the Naval Academy, who is also being retired, was formerly director of sports of the Wilhelmshaven station and after the war reorganized the sports in the navy.

Commander I. Schuenemann, who also leaves the naval service, organized the training shop for the education and training of naval machinists.

An important change takes place in depot inspection. The present depot inspector, Rear Admiral Freiherr von Freysberg, has been detailed to Geneva as naval expert for the League of Nations and the disarmament conference, and will remain there for some time. His successor will be the present director of the ships' artillery school in Kiel, Captain Punt.

The former chief of the staff of the North Sea naval station, Captain Meusel, has been designated commandant of the fortress at Pillau. Commander Massmann, formerly first officer of the line ship *Hessen*, becomes his chief of staff and Commander Kolbe takes command of the cruiser *Berlin*.

NOTE.—The foregoing is the method of selecting out practiced by the German Navy in order to obtain a normal flow of promotion in the line of the navy. There is no fixed rule regarding the numbers selected annually, this being left to the discretion of the chief of the Admiralty. It is to be noted that Rear Admiral Wegener, who is among those retired, is only 51 years of age; the other officers are younger. The ages of the present flag officers on the active list range from 50 to 56.

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5. *The Krupp-Germania Werft at Kiel-Gaarden.*

The works of the Krupp-Germania Werft, Kiel, were recently visited. I was shown around by Doctor Emmerich, who has succeeded Doctor Regenbogen as director in charge of these works. I was told that Doctor Regenbogen had accepted a position as consulting engineer for the Standard Oil Co., with offices at Hamburg.

Very little shipbuilding construction and repair is at present going on at this plant. A Diessel-motor yacht of 500 BRT is under construction. Another yacht of the same design, also for an American purchaser, has just been laid down. The firm has an order for another American Diesel-motor yacht. Negotiations are on the way regarding a fourth. I was also informed that the firm had been

awarded a contract for the construction of a fruit and passenger-carrying vessel for the North German Lloyd.

At present 1,200 men are employed, the usual maximum number being 6,000. The firm is engaged principally in the manufacture of machinery—Diesel motors and turbines. The construction of a number of Diesel motors has been just commenced and some stationery turbines are also under construction.

Experiments are at present being being made with a Diesel motor consisting of a one-cylinder unit developing 1,800 horsepower at about 80 revolutions per minute. This is a new design intended for eventual use aboard ship at low revolutions per minute.

The plant presents a sad spectacle in its present state of almost total inactivity.

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6. Wilhelmshaven as coaling station for merchant vessels.

[Source: German press]

The enormous increase of coal export resulting from the British coal strike has overburdened the German North Sea ports far beyond their normal shipping capacity. The equipments of the Emden and Nordenham ports, which are the chief centers of the Ruhr coal export to Great Britain, are adapted to ordinary export conditions, and in spite of numerous additional constructions they are unable to meet the present requirements.

This state of affairs caused the German shipping company "Mitgard" to seek utilization of the former coaling stations of the German High Sea Fleet at Wilhelmshaven. That section of the port as well as the greater portion of the six remaining basins are owned at present by an industrial company. The coaling station at Wilhelmshaven is very large, having been built in view of the requirements of the 50-60 warships and the innumerable smaller ships of the former German High Sea Fleet, whose 30,000-ton battle cruisers could coal within 24 hours. At present a weekly average of five medium-sized steamers come in to coal, but the capacity of the station is far in excess of that number.

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7. Trial trip of the Flettner rotor ship "Barbara."

I recently attended a trial and inspection trip of the new Flettner rotor ship *Barbara*. The ship left Hamburg about 8.30 a. m., proceeded as far as Cuxhaven, and returned to Hamburg about 9 p. m. the same day. About 100 guests made the trip at the invitation of the shipping company. A large number of these guests had been invited at the request of the German Admiralty. Among those on

board were Mr. Anton Flettner, the inventor of the new rotor ship, and Capt. W. Lohmann, of the German Admiralty, who was the representative of the German Admiralty on board during the various trial trips of the ship. This was the last trial trip before going into the service of the R. M. Slomann Jr. Co. as a freight ship between Germany and Mediterranean ports. The *Barbara* was constructed at the expense of the German Admiralty by the Aktiengesellschaft Weser, Bremen, and it has been turned over to the steamship company, Robert M. Slomann Jr., Hamburg, for operation. This company is going to operate a sister ship of the *Barbara* in every respect, except the Flettner rotors, in competition with the *Barbara* in order to determine the general economic possibilities of the new type of construction.

The ship is built according to the rules of the German Lloyd. The principal dimensions are as follows:

Length over all	293.632 feet.
Beam	43.309 feet.
Draft	17.71 feet.
Carrying capacity	2,800 tons.

The motive power installation consists of two single-acting four-cycle Diesel motors of the Weser "MAN" system, each of 530 horsepower. Both motors act upon a single propeller shaft through a Vulcan gear coupling and are capable of driving the ship with full load at a speed of 10 knots.

The ship is fitted with three Flettner rotors, each 55.77 feet in height and 13.12 feet in diameter. They are constructed of Lautal metal, an aluminum composition of very light weight and great stiffness. The rotors are mounted on ball bearings and each is driven by an electric motor of about 40 horsepower. Each rotor has its own electric motor installed at its base, capable of imparting 160 revolutions per minute to the rotors. I was informed that up to the present, only about 35 horsepower per motor was necessary to drive the rotors at 160 revolutions per minute. It is expected that under favorable conditions the rotors alone will drive the ship at a speed of 6½–7 miles an hour.

During this trip there was unfortunately very little wind, and it was not possible to operate the ship by means of the rotors alone. They were run at various times in conjunction with the Diesel motors, and it was estimated that at various times perhaps one-half to 1 knot speed was added by the rotors. The ship presents a very unusual sight, and one of the things to be demonstrated in actual service is the seaworthiness of the rotors during adverse weather conditions. Mr. Flettner claims that there would be no bad effects upon the rotors as such an effect could be easily regulated by the

rotation of the rotors. It is noted, however, that the forward rotor is rather close to the bow of the ship and any heavy seas washing over the bow might have a damaging effect upon the rotors. This is one of the points that remains to be demonstrated in actual service.

The ship is now on a voyage to the Mediterranean, and during her visit to one of the Spanish ports was inspected by the King of Spain. Captain Lohmann, of the German Navy, is making the trip as the representative of the German Admiralty, and Mr. Flettner is also on board.

Mr. Flettner told me that he expected in a short time to build a rotor tank ship. The Flettner Co. furnishes the following comparison with the *Buckau* (original rotor ship):

Technically the rotor installation represents a great advance over the *Buckau* in every respect, especially as regards the weight of the installation and the bedding of the rotors. The rotors of the *Buckau* were made of sheet iron while those of the *Barbara* are made of an aluminum alloy known as Lautal metal, 0.033 inch in thickness. The *Buckau* rotors weighed 2 tons each while each rotor of the *Barbara* only weighs 1.4 tons. In the *Buckau* the weight was about 110.23 pounds to about 10 square feet while that of the *Barbara* is slightly over 44.08 pounds. In the *Barbara* only ball bearings are used for the rotors while the lower bearing of the *Buckau* was a guide bearing.

B. AERONAUTICAL

1. The new airship "L. Z. 127."

Since January of this year the details of construction of a new airship are being worked out. Recently a certain amount of data pertaining to this new Zeppelin airship has been published. In the following article this will be supplemented by authentic disclosures.

With regard to the dimensions of this airship, the decisive limiting factor has been the size of the airship shed at Friedrichshafen. After it had been decided that this shed need not be destroyed and that no further restrictions would be imposed regarding the size of the airship which could be constructed in Germany, it was then decided to completely utilize the space at our disposal, i. e., to build an airship with a capacity of 105,000 cubic meters (3,700,000 cubic feet).

The experience of the last 10 years has shown that only a great increase in size will make this airship into that excellent vehicle and traffic carrier which its supporters have long foreseen, and the check of the plans of the giant seaplane, published within the last few days, shows what to many will be the surprising fact that the airplane in operation is not capable economically of meeting the difficult problem of trans-Atlantic air transportation. On the other hand, the primary problem of this new Zeppelin airship will be to demonstrate distant voyages. Actual facts will go much farther

to further the ideas of world commerce with airships than any number of plans and calculations made to-day on the economical operation of airships. Under these circumstances, it was decided at Friedrichshafen to carry the size of construction as far as the size of the shed would permit, that is, to build an airship which will exceed the last Zeppelin, *L. Z. 126*, by 35,000 cubic meters (123,500 cubit feet).

All of the details of constructions of this new airship which will carry the number *L. Z. 127*, have not yet been fully decided. In its outer general shape it will probably closely approximate that of its predecessor, the *Z. R. 111*, but may be built somewhat narrower. With a length of about 235 meters (767 feet), it will have a diameter of 30 meters (97.7 feet), and, as previously stated, a gas content of 105,000 cubic meters (3,700,000 cubic feet), thus representing the largest gas-inflated airship ever constructed up to the present time. The machinery installation will be similar to that of the *Z. R. 111*, in 1924, i. e., will consist of five 12-cylinder reversible Maybach motors, which demonstrated their great reliability on the trip to America. The power of the motors can be increased about 375 horsepower for continuous operation, retaining the same dimensions as the 300-horsepower motors, while, for the development of maximum power for shorter periods, it may be further increased to 420 or even 450 horsepower.

The cruising speed of this new ship may therefore be assumed at about 115 kilometers (68 miles) per hour, which under long-continued unfavorable weather and wind conditions may be increased to 135 kilometers (84 miles) per hour. In order that sufficient power may be available in such exceptional cases, it is proposed to install two small airplane motors in a special gondola, similar to the practice recently adopted with aircraft. Such engines are certainly not capable of continuous operation, but they give the commander an additional amount of power (800–1,000 horsepower) on which he can draw in time of emergency, and thereby meet all contingencies which might arise. The empty weight of this new airship has been computed at 60 tons in spite of the fitting of a more comfortable passenger gondola than that of the *Z. R. 111*. The useful load, i. e., the carrying capacity of importance from the standpoint of economy, is equal to 15,000 kilograms (33,000 pounds), with about 35 tons of fuel on board, which is sufficient for cruising radius of 10,000 kilometers (6,200 miles) for a period of 90 hours, neglecting, of course, the influence of the wind.

Since, in Friedrichshafen, we have been fully aware of the danger to passenger airships of carrying such large quantities of easily ignited light gasoline, which is to be considered as even more serious than the reasons advanved against the use of the "combustible

hydrogen," we have been engaged throughout these years of enforced inactivity in seeking a means to overcome this unquestionable weakness of airships. At the beginning of this year the Zeppelin Airship Co. was able to find a satisfactory solution of this problem, which, in addition to avoiding the danger of fire, at the same time increases the power of the vessel, and thus results in greater economy of operation. In place of gasoline a carbohydrate-gas mixture is employed, stored in special cells, which is very difficult to ignite and which serves as a fuel for the motors. The specific gravity of this gas is equal to air, so that the depletion of this gas supply when burned by the motors does not cause a variation in the bouyancy of the ship. Therefore, in the future when the fuel is used it will not be necessary to valve the bouyant gas in order to bring the ship back to equilibrium after same has become lighter through the consumption of fuel. This will also permit the use of such non-combustible gases as helium in the airship even in the countries where the excessive cost of this gas made its use prohibitive, since it will then be possible to keep the ship in equilibrium without sacrificing this valuable gas. When we consider that the heat content of 1 cubic meter (35 cubic feet) of this heavy carbohydrate-gas mixture is about 30 per cent greater than 1 kilogram of gasoline and that 1 cubic meter (35 cubic feet) of hydrogen lifts 1.15 kilograms (2.5 pounds), then we can understand why this new arrangement can be estimated as at least a 25 per cent increase in performance as compared with a ship of equal size with the older arrangement. Naturally, however, a certain small amount of liquid-fuel gasoline will still have to be carried as a precautionary measure. But such relatively small quantities of gasoline can be easily stowed in safety and supervised. At the same time this liquid fuel represents a supply of power and ballast and may be utilized to equalize conditions when the airship, which has ascended with filled gas cells, has been forced to valve some of the lifting gas, and has become "heavy." In order, therefore, to reestablish conditions of static equilibrium at the beginning of the voyage so that the motors can be used to the best effect, a corresponding amount of this liquid fuel may be burned. If we calculate for an initial cruising altitude of 300 meters (960 feet), it would be necessary then to carry a weight equal to 3½ per cent of the lift; i. e., about 4 tons in this case.

One especially advantageous fact is that in employment of this new gaseous fuel no essential alteration in the excellent new Maybach motors is required, except in the carbureter. The substitution of gas cells for the older gasoline tanks is a relief to the constructor, since it is certainly simpler to arrange for the installation of a number of cells which do not stress the framework to any extent

than to design the tank distribution for 30,000 kilograms of gasoline. A certain amount of delay in the completion of the ship will result as a consequence of these innovations, but it is still expected that same will be completed toward the end of 1927.

We are sure of the fact that the whole world will follow the trips of the *L. Z. 127* with the greatest interest. The problem will be to prove the feasibility of rapid trans-Atlantic transportation between distant points.

At the same time until the actual commercial plans have been put into effect this ship can be used in scientific investigation to increase the safety and confidence in airships as commercial carriers. Then the governments of these countries which are interested in aeronautical development will probably decide to appropriate the necessary capital to carry further the art of airship construction, particularly rigid airships, which has been conducted in such a brilliant manner in Friedrichshafen during the past 25 years.

NOTE.—The above was written by an engineer of the Friedrichshafen Works. Further details of this gas to be used for motor fuel were given in the August Bulletin. *L. Z. 126*, mentioned above, is the present *Los Angeles*.—ED.

GREAT BRITAIN

A. NAVAL

1. H. M. S. "Nelson."

Photographs in this BULLETIN show the *Nelson* as of September 1, 1926. Special attention is invited to the following:

(*a*) High angle of elevation of the turret-mounted 6-inch, 55-caliber broadside guns. (Apparently close to 60°. Total of 12 of these guns, three turrets on a side.)

(*b*) High angle of elevation of the 16-inch, 50-caliber guns as judged from the gun ports. This elevation reported to be 40°.

(*c*) Heavy antiaircraft-gun foundations on upper deck. Two of these are visible on each side, one near the forward break of the deck, one by the base of the stack; four of these on a side; total, 8.

(*d*) Low elevation of fire control and conning tower.

(*e*) Pillar form of foretop support.

(*f*) Presumably a control tower for either broadside guns, or main battery, aft of mainmast, on C. L.

(*g*) Presumably control tower for either broadside or antiaircraft guns, just forward of stack, one on each side.

(*h*) Foundations for four searchlights.

(*i*) Turret range finders mounted as in our latest battleships.

(*j*) Apparently small cross-sectional area of stack.

(*k*) Great number of ports for the release of internal-explosion pressures. These form the two bottom rows of ports visible. Some of them are covered with light plates, as eventually all of them will be. Compare in size with man standing on staging below after side of foremast. October BULLETIN showed the *Nelson* as of August 1, 1926.—ED.

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2. *Fire control and ordnance equipment of H. M. S. "Capetown."*

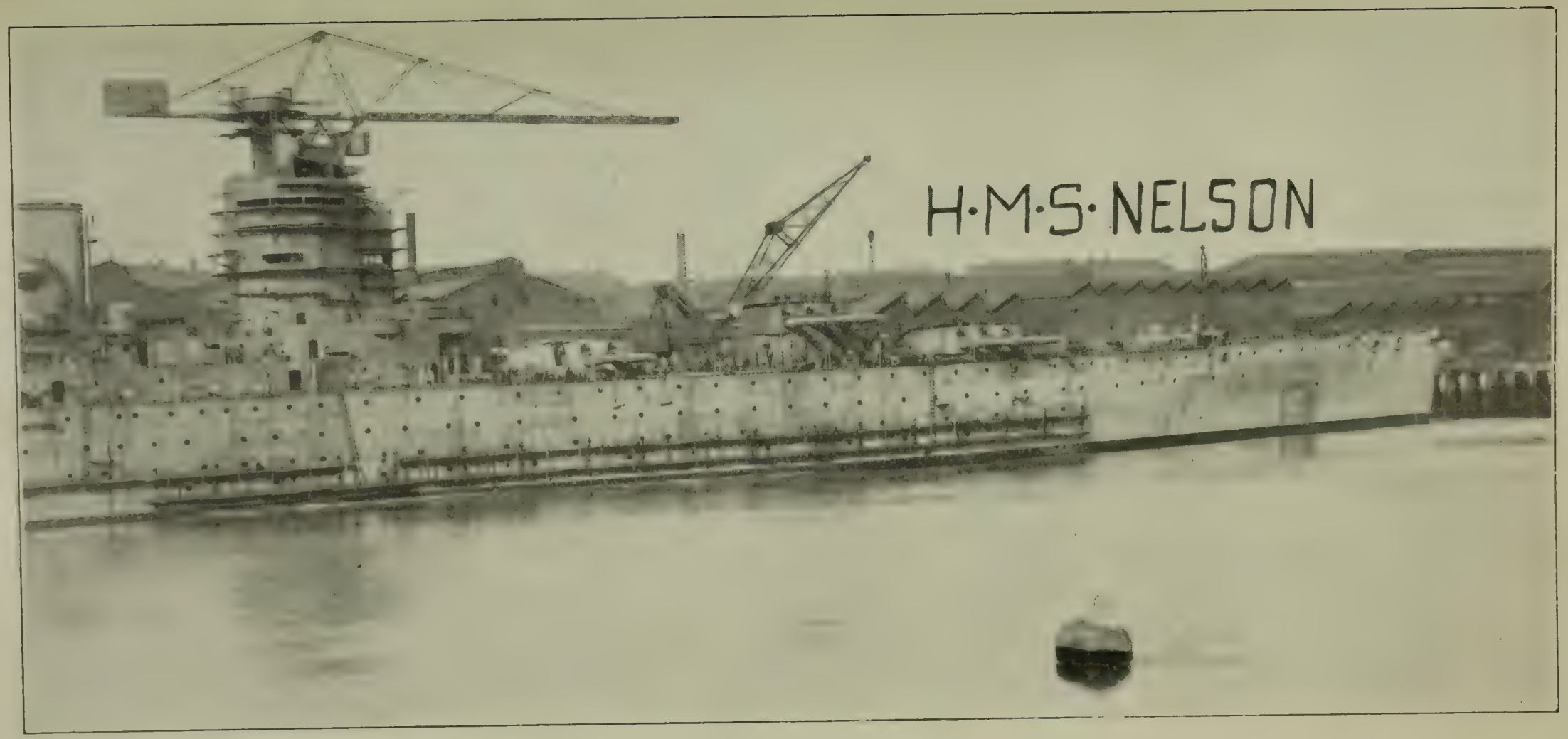
(*a*) *Fire control.*—System consists of two Vickers directors mounted on center line, one on foremast just below control station, similar to Omaha type, and one aft in a searchlight-control platform just forward of mainmast. Gun No. 4 located at after end of superstructure deck, is fitted with transmitting system which transmits angles of train and elevation in degrees and minutes to the transmission room, which is the same as the plotting room in the United States Navy. Transmitting room applies ballistic correction and transmits ranges to other guns. Two regular Vickers directors transmit elevation and train to guns direct.

Wiring of director system is in duplicate, a complete system running along each side of the ship.

Transmission room has a Barr & Stroud range keeper. Mean range is taken from range finders and applied to range keeper, where corrections are applied and converted. Advance range and deflection are then sent by a step-by-step motor (similar to Vickers motors) to gun directors and to the guns. Each step in this transmission system moves the indicators at directors 50 yards on range dial and 1 mil on deflection dial. The range and deflection dials are similar to our 6-inch, 53-caliber. A black pointer indicates range and deflection sent out electrically by transmission room and an outer dial rotating concentrically with range and deflection dials has red pointers for matching the black electrically operated pointer. This system permits continuous sight setting on all guns and directors.

Range finders are Barr & Stroud, latest type "II–12" (30,000-yard) are located just forward of the fore and mainmasts respectively on superstructure deck. Four 6-foot base Barr & Stroud range finders are located two forward and two aft, similar to our own group-control arrangements.

Directors are fitted for master key similar to our own and no local cut-out switch is provided at gyro. A selective switch is located at each gun which provides for No. 1 and No. 2 directors and for local control, so that each gun can cut itself in or out of any particular director system.


H·M·S· NELSON

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Two local control-firing keys are located at each gun at the gun layer's position. One electrically operated with pistol-grip finger trigger. The other is percussion fire with pistol grip which has a firing lever fitting the palm of the hand of gun layer.

Position of inner end of gun layer's telescopic sight is about 8 feet in front of location of elevation indicator which is mounted on rear end of the slide of the gun. Trainer's indicator is mounted just under and left of trainer's telescope and abreast gun trunnions.

Individual slewing wheel for fast training of gun is located directly under the trainer's telescope. A shift lever is provided for changing from slewing gear to slow-training gear. This shift system resembles our own high and low training-gear system on 6-inch, 53 guns. The slewing handwheel has a course reading, step-by-step receiver, located just over slewing control wheel.

Guns are provided with a target-bearing designating system for night firing. Bearing transmitted by the director and indicated on dial to right of trainer on spray shield, consists of dial with luminous arrow-headed pointer about 3 inches long. The pointer travels an arc of 90°, 45° point being directly over axis of pointer. At left of arc is a letter "L," on right edge the letter "R," and in center the figure "0." These letters and figures are luminous for night work, in indication whether to train right or left to get on target.

Director system is not provided with repeat back indicators.

Their elevation and training indicators can be lined up when connected up electrically with director on any bearing which is impossible on our Vicker-equipped light cruisers. This is done by a milled knob which for lining up is pushed in toward receiver. The shaft of this knob engages the step-by-step motor and turns rotor against the tendency of the electrical field in direction desired, and corrects dial settings in increments of one minute. This system is used only for corrections up to minutes; for larger corrections it must be cut. Elevating and train receivers are similar to our own.

No voice-tube outlets were noticed at guns.

Two telephones were noticed hanging above gun-layer station. They had only one earpiece with transmitter and had a clamp for supporting around head; was informed that they worked very well.

Receivers are modified Vickers manufactured by Sheffield.

Target-bearing designator system made by Barr & Stroud.

Director firing is done on up roll.

Stabilized sight manufactured by Barr & Stroud is installed on both directors. Principle same as Ford sight. Apparently there is some reason for not firing on down roll, which could not be learned.

Best firing interval under director fire is eight seconds.

Four 36 inch searchlights are director controlled similar to our own.

Since guns are center lined, after director and gun 4 are merely used as "Stand by"; all primary controlling being done from forward. With only five guns, divided fire is considered somewhat of a remote possibility.

Ranges and deflections are not transmitted vocally.

No range and deflection visual system similar to our own Corey or Arma were noticed at gun stations.

Chain of command: Control station forward with director 1, director 2, and gun 4 in conjunction with transmission room.

(*b*) *Guns and mounts.*— The special feature of the mount is the loading tray. This tray is attached to all 6-inch guns now in use in the British Navy. It is installed on the recoil cylinder, which is under the center of the gun, by means of a bracket. A supporting arm extending from the bracket, which is about 3 inches in diameter and about 4 feet long, running on an angle of 5° to the left of the recoil cylinder and ending at the rear of the breech of the gun. On the end of this supporting arm is another smaller arm connected to the large arc by means of a "pivot," with a frictionless washer to reduce friction: this allows the small arm to move in azimuth. This arm then runs back on an angle to the left of the large supporting arm. It is on this small arm that the loading tray itself is mounted: it is attached to the arm by means of another pivot, with a frictionless washer allowing it also to move in azimuth. The tray is equipped with a locking device on its handle similar to the firing key used on our own antiaircraft guns: the handle is on the left side of the tray. When the projectile is placed on the tray there is a small rest plate for the base of the projectile so as to prevent a shell from sliding back off of the tray when loading at a high angle of elevation.

The tray can not be moved until the breech plug is opened. This is caused by the guide plate, which is made of brass and attached to the rear of the breech just under the breech plug by means of two steel pins, which are fitted into elongated holes in the guide plate running on an angle of 45°, allowing the guide plate to move left and right as the plug is opened and closed. When the breech plug is closed the guide plate is on the left side of the plug and under, preventing the tray from being moved: this acts as a safety device: but as the plug is opened a cam fitted to the bottom end of the hinge pin engaging the fixed ball, on the right side of the guide plate, causes the guide plate to be drawn to the right and up, acting as a guide for the nose of the projectile into the breech, and preventing scarring of the screws in the screw box. The "trayman," as the operator is called, stands on a pedestal mounted on the gun shield and, when the plug is opened, grasps the loading-tray handle and by

gripping it hard unlocks the loading tray: it is now ready for use. The trayman pulls the tray toward himself for about 8 inches, this movement being at the pivot connecting the supporting arm and the small arm the tray is attached to: he then shoves it back and to the rear of the breech, causing the tray to come in a direct line with the breech; the tray is then shoved forward, causing it to swivel at the frictionless pivot connection of the tray to the small arm. This is done all in one movement very rapidly, causing the tray to come in contact with the guide plate with enough force to drive the projectile into the breech; a rammerman is used also to seat the shell. The tray is then brought back to its normal position for another load; this tray can be used at a 30° angle of elevation: it is so successful that 12 loads can be made in 58 to 60 seconds. The trayman stands on a pedestal which revolves with the spray shield.

The gun is provided with a salvo latch which makes it impossible to fire the gun until the breech is closed and breaks the firing circuit when breech is open (one-half-inch movement of breech breaks firing contact); does not prevent opening breech until gun is fired as on our 6-inch, 53-caliber. Projectile looks smaller than ours, with rather blunt nose, but was informed it weighed 104 pounds. Mounts are very high because of 30° elevation; was informed guns have a 20,000-yard range. Mushroom and gas-ejecting pads similar to our pad composed of 70 per cent asbestos and 30 per cent tallow but has a fine copper mesh wire running through it similar to construction of reinforced concrete. Electrical leads are led up through cover plates similar to our own installations.

(*c*) *Wiring.*—Gun firing at the guns is duplicate. These wires had special fittings at the ends to make connections. Was informed that one set led up from below the protective deck from the port side and the other from the starboard. At the base of the guns are switching arrangements so that the gun crews can connect up either set of leads. This duplicate of wiring is to provide for casualties on either side. Firing circuit not provided with batteries; motor generator and percussion are only firing systems provided.

(*d*) *Lighting, battle lights, etc.*—Light is installed at rear overhead of spray shield which shines down on breech. No colored bulb provided, but actual light is blanketed from rear. Apparently no other night-battle light provided.

(*e*) *Ammunition Supply.*—Straight hatch with arrangements similar to old-time ash whip; manila lines, reels, and differential engine. Ammunition passing scuttles were noticed near handling rooms and ammunition hoists. These are about 10 inches in diameter and covered by a brass flap door hinged from the top. The scuttle is offset from the vertical about 10° so that the flap door is seated by grav-

ity. These flap doors are installed athwartship so as to be unaffected by the ship's rolling.

(*f*) *Gas masks.*—Gas masks are provided and stowed in small lockers in the spaces throughout the ship; was informed that they are used at least once a week by all hands at battle stations.

(*g*) *Torpedoes.*—Tubes trained by two hand-drive windlass transmission. This permits very fast training. Torpedoes are handled by means of a carrier operated on an overhead arrangement of I beams, with lead from the torpedo stowage and workshop to the torpedo tubes. These I beams are bolted on to the skid deck overhead. The beams are about 6 inches high and have 2-inch flanges on either side upon which the carrier rides. The torpedo stowage and workshop compartment is located on the port side of the ship on the main deck at the break of the forecastle deck.

NOTE.—The *Capetown* is a war program cruiser, completed in 1922. She displaces 4,190 tons, mounts five 6-inch, 50-caliber C. L. guns, eight 21-inch torpedo tubes, and has a designed speed of 29 knots. There are 10 vessels in her class.—ED.

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3. *Activities of the Atlantic Fleet.*

The following has been culled from several recent issues of newspapers and publications:

For the benefit of the Dominion premiers the British Atlantic Fleet recently staged an exhibition which included practically all branches of the service. The premiers and their party on board the *Revenge* witnessed first the laying of a mine field off Weymouth and the sweeping of a channel through the field for the *Revenge* by mine sweepers. Later two submarines of the L class attacked the *Revenge*, making four hits on her at a range of 1,200 yards, none of the torpedoes sinking. Next the destroyer flotillas dropped twenty 300-pound depth charges in an antisubmarine attack.

The *Revenge* then made contact with the battleships and battle cruisers of the Atlantic fleet, consisting of the *Iron Duke*, *Emperor of India*, *Marlborough*, *Hood*, *Repulse*, and *Renown*. These latter vessels steamed on a course parallel to the target in the same direction, and at a distance about 16,000 yards from the target. The *Revenge* took station about half way between the fleet and the target. The target was a latticework raft 120 feet long and 25 feet high, painted brilliant red, and towed 600 yards astern of a sloop at a speed of about 8 knots. The speed of the Battle Fleet was 18 knots. The three battle cruisers then commenced a concentration firing on the target. The *Hood* first fired three 4-gun salvos in rapid succession. The *Repulse* and the *Renown* then opened up, but the target was not straddled until the fourth salvo. It was probably only straddled twice more, although several salvos were fired by each ship. No

direct hits were made. Apparently each ship fired one gun per turret salvos (i. e., four guns for *Hood*, three each for *Repulse* and *Renown*); firing controlled by *Hood;* order of firing, *Hood*, *Repulse*, *Renown*. Visibility was very good; sea choppy.

Upon the termination of the gun firing the fifth destroyer flotilla then made a torpedo attack on the *Revenge* from the bow, at a range close to 9,000 yards. All torpedoes crossed the line and two actually hit the *Revenge*.

The program culminated with the laying of a smoke screen by the fifth destroyer flotilla.—Ed.

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4. Firing of "Renown."

H. M. S. *Renown*, battle cruiser, during the recent exercises from Cromarty, fired her 15-inch guns for the first time in six years, having been on Royal cruises and in dockyard hands, refitting, for this period. Within a minute and a half of the ship opening fire, the target was straddled at a range of 8 miles.

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5. Progress of construction.

In regard to new construction authorized prior to the 1925–26 to 1929–30 program, the total provision contained in the 1926–27 estimates is £6,217,219 to provide for progress on—

Two battleships (*Nelson* and *Rodney*).

Five cruisers (*Kent* class).

Two cruisers (*Emerald* and *Enterprise* completed).

One mine layer (*Adventure*).

Two destroyers (*Amazon* and *Ambuscade*).

Three submarines (one O class, two L class to be completed).

Progress of work on the above program has been delayed due to the adverse effect of the coal strike on the supply of materials and the general depression in the shipbuilding industry. Late information from the Admiralty indicates the vessels of this program to complete during the current financial year are as follows:

Adventure will complete February, 1927.

Amazon will complete end of 1926.

Ambuscade will complete end of 1926.

Oberon will complete beginning of 1927.

Of the balance of the program, the *Nelson* and *Rodney*, in the order named, will not complete until later (*Nelson* now expected for summer of 1927); the *Emerald* and *Enterprise* have been completed. The vessels of the *Kent* class have all been launched and work is in progress; the two L submarines have been completed, although press reports indicate that the *L–26* has returned to the dockyard for additional work after trials. In addition the submarines *Otway* and *Otley* building in England for the Australian

navy are expected to complete in the spring of 1927 and the 10,000-ton cruisers, *Canberra* and *Adelaide*, building in England for the Australian Government, are under construction at John Brown & Co. (Ltd.); keels laid September 9, 1925, and August 26, 1925, respectively.

Of the 1925–26 to 1929–30 new construction program, the following is noted:

Provision is made in the approved program and money was voted in the 1925–26 estimates to begin construction in that year of four 10,000-ton cruisers (class A), four gunboats, and one floating dock. Of the above cruisers the *London* is under construction at the Portsmouth dockyard, keel laid February 23, 1926, and the *Devonshire* at the Devonport Dockyard, keel laid March 16, 1926. The *Sussex* and *Shropshire* have been awarded, respectively, to Hawthorne, Leslie & Co. and Beardmore & Co. (Ltd.), although the keels have not yet been laid. Orders were placed in March, 1926, for the four gunboats with Yarrow & Co. (Ltd.). The floating dock has not been awarded, although this project is now before the Admiralty, and announcement of the award to a firm on the Tyne is expected shortly.

Provision is also made in the approved program and money was voted in the 1926–27 estimates to begin the construction this year of the following: Two 10,000-ton cruisers (class A); one 8,000-ton cruiser (class B); six submarines, O type; four motor launches; one submarine depot ship and one repair ship. Of the above, one cruiser according to press reports has been awarded this month to Palmer's Shipbuilding & Iron Co. (Ltd.), and it is reliably learned that this is the type "B" cruiser (8,000 tons). The submarine depot ship was awarded in September to Vickers (Ltd.). It is understood that awards for the balance of this year's program will not be made until near the end of the financial year, due, presumably, to the small amounts appropriated for them this year.

In view of the delay in starting all of the 1926–27 program of new construction and the delay in advancing the earlier program as estimated during the current year, it would appear that the sums to be expended on new construction in succeeding years will have to be increased if the entire new construction program is to be completed by 1929–30. The amounts to be spent on current maintenance, repairs, and reconstruction can not well be reduced over the current year's estimates if the present size of the British Navy is retained. The amount covered in the 1926–27 estimates for the purpose is £1,873,600 while the corresponding amount carried in the 1925–26 estimates is £2,192,555.

In connection with the program of new construction and the disposal of older vessels, there has been considerable comment in the

press and certain periodicals to the general effect that the new vessels added to the navy, particularly destroyers and cruisers, up to and including 1929–30, with the vessels remaining on the list at that time will not be sufficient in number to meet the minimum needs of the navy.

Efforts to secure increased financial aid from the colonies and dominions for the Royal Navy, have, it is understood, not been encouraging, but the subject of imperial defense is one of the important subjects being considered by the Imperial Conference now in session. In addition to the amounts separately appropriated by the dominions and colonies for local naval defense purposes, India contributed for the maintenance of His Majesty's ships in Indian waters £100,000; Hong Kong contributed in aid of the Singapore Naval Base £130,000 (represents balance of contribution of £250,000 for which provision was made in 1925). In June, 1926, the Secretary of State for the Dominions announced that he had accepted on behalf of the Imperial Government an offer to contribute £2,000,000, to be paid in five annual installments, by the Federated Malay States in aid of the Singapore Naval Base project.

As regards capital ships affected by the treaty limiting naval armaments, the battleships *King George V*, *Ajax*, and *Thunderer*, and *Agammemnon* (target ship) have been ordered to dockyards preparatory to their disposition as required by the treaty. The *Centurion* will be converted to a target vessel in lieu of the *Ajax*, the vessel listed in the estimates for conversion to a target vessel, in place of the *Agammemnon*.

NOTE.—Hence, from the beginning of 1926 to the end of the 1929–30 program the following vessels are or will be completed:

35,000-ton battleships:
- *Nelson.*
- *Rodney.*

10,000-ton cruisers:
- *Kent.*
- *Suffolk.*
- *Cornwall.*
- *Berwick.*
- *Cumberland.*
- *London.*
- *Devonshire.*
- *Sussex.*
- *Shropshire.*
- No. 10 (unnamed).
- No. 11 (unnamed).
- *Canberra.*
- *Australia.*

7,600-ton cruisers:
- *Emerald.*
- *Enterprise.*

8,000-ton cruiser:
- No. 1 (unnamed).

7,260-ton cruiser—mine layer:
- *Adventure.*

1,250-ton destroyers:
- *Amazon.*
- *Ambuscade.*

890/1080-ton submarines:
- 2 L class.

1480/1750-ton submarines:
- *Oberon.*
- *Otway.*
- *Oxley.*
- 6 more of this class at least.

1 subarine depot ship.
1 repair ship.
1 floating dock.
4 China gunboats.

—ED.

6. *Modernization of capital ships.*

This information may be summarized as follows, it being noted that the *Warspite* has been completed and the *Queen Elizabeth* is now in the dockyard for modernization:

(*a*) *Bulges.*—The following ships have bulges: *Resolution*, *Ramillies*, *Revenge*, *Royal Sovereign*, *Warspite*, *Queen Elizabeth* (bulges being fitted), *Royal Oak*, *Repulse*, *Renown*, *Hood* (built with internal bulges).

It is understood to be the Admiralty's intention to continue the program by bulging all vessels of the *Queen Elizabeth* class. The *Queen Elizabeth* has been substituted this year for the *Valiant*, the battleship listed in the estimates, 1926–27 for reconstruction. The *Nelson* and *Rodney* are being built with internal protection.

(*b*) *Gun elevation.* The Admiralty have stated officially on January 5, 1923, that no British capital ship has had the angle of elevation increased since its original fitting out and that no increase is contemplated. The present angle of elevation of all capital ships, with the exception of the *Nelson* and *Rodney*, is 20° except the *Hood*, which has 30°. From the best information obtainable the maximum angle of elevation for the main battery of the *Nelson* and *Rodney* is 30° with the possibility that this angle may be as much as 40°.

(*c*) *Oil burning.*—So far as is known none of the retained capital ships has been converted from coal burning to oil burning.

(*d*) *Armor.*—No change.

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7. *Dockyard work.*

[Source: English press]

As a direct result of the coal strike, work upon the new cruisers building in the Royal yards has had to be seriously reduced. Moreover, the contracts for component parts which are not manufactured in the Government establishments will be heavily overdue from the same cause. As a consequence it will be impossible to bring the ships to the launching stage for a long time—possibly some months—after the dates originally provided for. This will mean that the building slips will not be available to take fresh keels. The Admiralty have definitely decided that there is to be no delay in carrying out the five years' replacement program, since new construction has already been deferred to the very limits of prudence. Therefore, it comes to this: If the Royal dockyards can not lay down new ships which it had been decided to give them within the financial year for which the estimated expenditure upon them is voted, the orders will be given to private yards.

This dislocation in the steady continuity of work in the Royal dockyards, coming as it does at a period when things were becoming

stabilized in a very satisfactory manner, is to be much deplored. The policy of naval work for naval yards first and foremost, and the balance of what they can not undertake for the private yards, has produced very good results in the Royal dockyards. Without a steady flow of new construction work, however, the present standard of efficiency is bound to suffer. Repair and maintenance work these days is not on a scale to provide adequate employment for the workers and the staff. The Admiralty have done well in thus far refraining from meeting the situation by discharges, which is the policy advocated by the exponents of national economy. But the outlook for the Royal dockyards just now is rather disquieting, and the air is heavy with rumors of serious reductions in these establishments.

B. AERONAUTICAL

1. "R–33" as an airplane carrier.

[Source: English press]

A service single-seater fighter was successfully launched to-day from the *R–33* while the airship was 2,000 feet over the Pulham Station, the whole operation being carried out with a precision that was distinctly significant. A second fighter was later released at Cardington Aerodrome, 90 miles away, so that for the first time in history two aircraft were carried under and released in two separate areas from an airship in one flight.

The more intricate problem of rehooking standard service airplanes has yet to be solved before the full value of airplanes as a defensive and offensive adjunct to the airship can be secured. There is no reason, however, to suppose that once research begins in earnest this phase of the use of an airship as an airplane carrier will not be achieved.

In any case, to-day's experiment represented a distinct step forward, as the *R–33* came out of her shed here in the early morning with two fighting aircraft, each weighing over a ton, suspended from her; and so far no airship has ever carried more than one airplane, and that not of anything like the same weight. The two machines, standard Grebe fighters, were slung below the broad underside of the airship, one between the control car and the first two engine nacelles, and the other between the latter and the rearmost nacelle. Each machine was held by one center fitting on the top plane above the center of gravity, and two struts from the airship each coming to a point on the wings over the outer strut fitting on the front spar. Another strut to a point halfway along the fusilage held the airplane rigid by a three-point compression against the pull

of the central fixing. Here a quick-release gear was under the control of the pilot, so that he could drop clear away merely by pulling a lever. A hole in the airship gave access by a rope ladder to the co-kpit, and a flexible tube enabled a Bristol gas starter in one of the engine nacelles to be connected to the airplane engines for starting purposes.

The essential condition to a successful release, at any rate with the present gear, is that the airship should be moving at a speed somewhat below that of the airplane, so that the latter should drop at once clear of the larger vessel. Everyone watched with close attention as the airship came over the airdrome to see if the Grebe fell away in a dive and to ascertain how quickly the pilot could gain control. Actually the operation was so smooth that the airplane merely parted company with the ship and flew away at an angle of 45°, apparently under control from the moment it left the ship. In fact, it was learned afterwards, the controls became fully operative after a loss of 100 feet.

NOTE.—The *Shenandoah* was practically a sister ship of the *R-38*.—ED.

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2. *Progress in aircraft.*

[Source: Maj. C. C. Turner, English press]

About 18 months ago the Air Ministry ordered a number of two-seater airplanes of the type known as Fairey "Fox" day bombers, fitted with the Curtiss 430-horsepower engine made in the United States. This engine, to which the name "Felix" has been given, has a smaller frontal area than any British aero engine of the same power, and this was the principal reason for its adoption. Thirty of the engines were ordered from the United States, this being about the number required for a squadron's machines and reserves; but one or two of the engines were fitted to a new type of single-seater fighter, the Fairey "Firefly," a machine which has not yet been adopted for the service and reached the production stage. Both the "Fox" and the "Firefly" were seen at the Royal Air Force display last July, and were much admired for the cleanness of their design and the impression of speed they gave. In the event of the adoption as standard types for the Royal Air Force of aircraft fitted with the "Felix" engine, or of sufficient foreign orders for such aircraft, no doubt the original intention of manufacturing and developing this class of engine in this country would immediately be carried out. Possibly this is still contemplated, but I understand that so far as orders for the Royal Air Force are concerned no more of these engines are to be imported, and in the event of a big demand for the type it would have to be manufactured in Great Britain.

At the time the order for American-engined airplanes was given it seemed unnecesary to order so many as 30; many thought 10 would have been sufficient for a reasonable test. The air staff, however, desired to equip a whole squadron, and to apply the complete test of normal service over an extended period; and there can be no doubt that, apart from the cost and the work and encouragement given to another country, this is an excellent way.

THE LATEST DAY BOMBER

For the "day-bomber" class the tendency now is to employ engines of considerably more than 430 horsepower, which power, indeed, is no longer regarded as sufficient even for certain kinds of single-seater fighter, although engines of about 400 to 450 horsepower are still used in two-seater fighters, and also in that class of single-seater fighter in which great maneuverability is an essential quality. Some confusion is apt to be caused by the designation of "day bomber" loosely applied to different classes, including the two-seater fighters and "escort planes," which are usually unable to carry the very heavy military load now demanded in the day bomber, and at the same time to yield the necessary high performance. The newest standard day bomber is the Horsley, which is fitted with the 650-horsepower "Condor" engine, and is almost entirely a metal structure. This embodies the new steel tube of square section with rounded corners, a section facilitating working, simplifying manufacture, and at the same time immensely strong. The military load of the Horsley is considerably more than a ton, and its speed, rate of climb, and ceiling make it the supreme type of its class in the world at this moment. And it is doubtful whether any machine with an engine of less power could carry the military load and give the performance now demanded for the Royal Air Force in a day bomber. Doubtless a complete squadron of Horsleys will be seen at the Royal Air Force display next summer.

Of late there has been some publicity for the wonders of United States airplane design, and a recent United States Government specification has been publishd in support of a claim that British design is lagging behind. The complete reply can not, unfortunately, be given, for the reason it is not politic to publish the equivalent British specification, or, for that matter, any recent Air Ministry specification to which British manufacturers have to work; nor is it permitted to publish figures relating to load and performance of our newest types of airplane. There is one outstanding United States airplane constructor, but in Great Britain there are several of the first rank as design firms in keen rivalry with each other; and a fascinating subject for an article, were it permissible, would be the latest

details of construction and equipment embodied in that engineering triumph of power, performance, utility, and lightness, the "secret" naval or military airplane of to-day. One type has 300 pounds of wireless equipment alone. Here, too, it may be remarked that in the United States a great deal of attention has been concentrated on the development of the high-speed racer, and that when types so developed are converted into service types not quite the same performance is obtained. Given a chance, British engine makers will produce an engine of a small frontal area, and an air-cooled one at that.

POLICIES OF DIFFERENT COUNTRIES

The United States specification for a single-seater fighter does not show so high a performance as that of certain British machines about to be ordered, or actually in production, for squadrons. I have in mind one particular machine which can climb 2,000 feet higher than the American type and is faster at all altitudes, and yet can land slower. The American specification, in fact, is not very remarkable; but it should be remembered that the United States staffs have to take a different standpoint and to consider possible military operations of a different nature from those in the mind of the British air staff, and that therefore only a general comparison can be made. It is possible that from the American point of view a fairly high landing speed is not a grave drawback; the British view is that for any likely operations low landing speed means economy in material, lives, and morale.

Great attention is paid in British design, counseled by the Air Ministry, to the features which make for the comfort and efficiency of the pilot. Thus in one machine the pilot is able to raise or lower his seat by the simple movement of a lever. Not only does this obviate the need for special adjustments for short or tall pilots, but it enables a pilot to raise himself to get a better view, to lower himself for protection, and to get into the best position at any moment for sighting his guns.

British constructors have for some time been concentrating on designs which will permit of rapidly expanded production in emergency. To this, all-metal construction lends itself; but, not only so, the method of construction must be such that at need the work could be done in any well-appointed workshop in the land. Metal construction saves in weight as compared with wood, and it saves in storage and insurance. All-metal construction for boats and floats of seaplanes is absolutely necessary.

THE "INTERCEPTOR"

Class designation is confusing in more cases than one. The single seater is called the "Fighter," but there are fighters better adapted for

night than for day work, and there is a class of "interceptor fighter" (whose name speaks for itself). Always there is this tendency to increase the power, and to-day there is an interceptor, the *Hornbill*, with engine of 650 horsepower, which is certainly the most formidable night fighter in the world and with the best performance in every way. The interceptor airplane must be able to mount high very swiftly and still have at least two hours' duration of flight left. But for day fighting against enemy single seaters, great maneuverability is essential, and for this quality comparatively light loading is necessary. One of our newest all-metal machines is so designed that any one of three air-cooled engines, supercharged or not supercharged, can be fitted; and it can no longer be alleged that the supercharger is neglected in this country.

In workmanship the British manufacturer is acknowledged to be supreme, and there is no reason to suppose that the breaking of "records" by France and the United States is significant of anything more than concentration on that department. As the Prime Minister stated in reply to a question in Parliament on August 5, there is no connection between the winning of records which ordinarily fall to machines specially designed or modified and not suitable for general use and the present air policy of the Government which aims at securing an efficient air service.

ITALY

A. NAVAL

1. Launching of the "Trieste."

On October 25, 1926, the new light cruiser *Trieste* was launched at the Stabilimento Tecnico Triestino of Trieste. She was christened by the Princess Giovanna of Savoy, daughter of the King.

The Italian press emphasizes the importance of the new ship. The "Tribuna" says:

> It is a fact forth noting that the Trieste has been built in the yards of the port that was once the main Adriatic harbor of the Austrian Empire. Only twelve years ago it would have been madness to hope that a new up-to-date, high-class Italian warship should have been built in Trieste. The yards in the Venetian Provinces that have helped so powerfully in these last years in the reconstruction of our mercantile marine are now beginning to furnish the Navy with vessels constructed in the same yards that once built the formidable ships of the Austrian Empire.

NOTE.—The *Trieste* will be of 10,000 tons, with a speed of about 35 knots, mounting eight 8-inch, twelve 4-inch antiaircraft guns, and eight 21-inch torpedo tubes. She will also mount an airplane catapult. Her sister ship, the *Trento* is about equally as far completed.—ED.

2. *Officer personnel.*

The Italian Navy has, in addition to the regular naval officers and the reserve, a special set of officers called "additional" or "di complemento." The existence of his class of officers is due to the special conditions created in Italy by the conscription system. All young men who are annually recruited by the levy are entered as enlisted men, and serve their term as such. But some of these have a certain degree of education and would like to rise above the rank of enlisted men, while not wishing to enter the navy as a profession. This specially applies to young men who wish to enter the merchant marine, who had already had a certain amount of sea training in the nautical schools, and are therefore above the average recruit. It might perhaps be expected that youths entering the merchant marine would be exempted from compulsory service, but the law does not make an exception for them. It does, however, place them in a special position, and this is the position of officers "di complemento." Instead of serving their term as enlisted men, youths with a certain degree of sea training are allowed to enter the naval academy (after passing preliminary examinations) for a year, at the end of which they are appointed midshipmen "di complemento." They differ from the regular midshipmen in the important particular that instead of continuing service they are immediately relieved from active service. Their names, however, remain on the list of officers "di complemento," and in the case of mobilization they may be called to the colors to serve with their "di complemento" rank.

Thus young men who wish to enter the merchant marine gain a double advantage from enlisting as officers "di complemento": (1) They increase their sea training during the course at the naval academy; (2) in case of mobilization they are entitled to rank, instead of serving as enlisted men. Even then they are never considered as belonging to the regular establishment and remain "di complemento." The advantage to the navy lies in the augmentation of the trained commissioned reserve.

Officers "di complemento" may also be called to active service in time of peace to fill up gaps in the regular establishment which may not be filled otherwise (e. g., by calling back regular officers who have retired, etc.).

Should midshipmen "di complemento" desire to continue service in the navy after they have finished their course at the academy, they may be granted three years more, provided they fulfill certain requirements. In the June "Bollettino," there is a list of midshipmen "di complemento" who have been granted this three years' further service ("rafferma di tre anni"); some of them have been promoted lieutenants (junior grade) during this period of additional service.

But as this additional service does not last longer than three years, they do not rise higher.

The above applies to youths coming from the nautical schools. They made up line officers and engineer officers "di complemento." Youths with a university degree in engineering, medicine, or chemistry may become officers "di complemento" of the Construction, Medical, Pharmacists Corps, respectively; with a degree in commerce or law, they may become either officers "di complemento" of the Supply Corps or harbor captains. On mobilization, the length of time they have worked in civil life as engineers, doctors, etc., entitles them to rise in rank, after passing preliminary examinations: e. g., if they are university professors of medicine they may become at once majors of the Medical Corps; if they have been doctors 15 years they may become captains, etc. Staff junior officers "di complemento" may request to serve for three years in addition to their conscription term, just as midshipmen "di complemento."

The list of officers "di complemento" includes many officers above the rank of lieutenant (junior grade). These are the men who were called to the colors during the great war as officers "di complemento," who were promoted during service, and have not reached the age limit, which is 55 for all ranks and corps. After this, officers "di complemento" are retired. The highest grade that an officer "di complemento" may reach is lieutenant commander.

Chief warrant officers who have served their conscription term may become, after passing examinations, lieutenants (junior grade) "di complemento" of the Royal Equipage Corps.

Italian naval officers are thus classified as follows:

ACTIVE SERVICE

(*a*) Officers of the regular establishment.

(b) Officers "di complemento," junior grades, serving under conscription.

(*c*) Officers "di complemento" who have completed their conscription period and who have been retained or called back to active service.

(*d*) Officers of the reserve who have been called back to active service.

UNEMPLOYED OFFICERS

(*a*) Officers "di complemento" who have served their conscription term.

(*b*) Retired officers.

JAPAN

A. NAVAL

1. Loud-speaking telephones.

The Western Electric Co. is installing loud-speaking telephones on two battleships.

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2. Airplane carrier "Akagi."

According to the Japanese press, the airplane carrier *Akagi* left Kure October 7 for Yokosuka. While en route from Kure to Yokosuka high-speed trials were held.

While the *Akagi* is in Yokosuka she will receive equipment for her hangars and flying deck, and about the end of October, 1926, will again return to Kure to complete her ordnance equipment. The ship was completed ready for sea on October 7.

NOTE. The *Akagi* is a sister ship of the *Kaga*, also building. She is of 27,000 tons, speed about 29 knots, mounts ten 8-inch, twelve 4.7-inch A. A. guns, and will carry close to 70 planes. She was originally laid down as a battle cruiser. ED.

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3. Launch of "Kinugasa."

The Japanese cruiser *Kinugasa*, 7,100 tons, which will have a speed of 33 knots, was launched from the Kawasaki dockyard recently.

The *Kinugasa* is the last of the group of four 7,100-ton cruisers ordered after the Washington Conference, two of which were laid down in 1922 and two in 1924. The first ships, the *Furutaka* and *Kako* have been undergoing their trials this year, and the *Aoba* was launched last month. The principal armament of the new ships will be 8-inch guns.

NOTE.—The *Kinugasa* and her class mount six 8-inch guns in three twin gun C. L. turrets and carry twelve 21-inch above-water torpedo tubes. They are designed to develop 100,000 S. H. P. and a speed of 33 knots.—ED.

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4. Cruiser "Myoko."

The following information was recently obtained on the engineering plant of the *Myoko*.

Outside hull plating about 80 per cent complete. A double or triple hull construction very apparent, extending well above the water line. Below this hull construction there is an additional bulge or blister extending down to the bilge keel and fore and aft about

the length of the engine and fireroom spaces. Extremely fine lines of hull noted, especially forward.

Main engines.—Four shafts and turbine units of combined Curtis-Parsons marine type, with reduction gears. Turbine blades in first stages are a noncorrosive steel, in later stages phosphor bronze. Total indicated horsepower about 100,000. Turbines built in Yokosuka yards. One turbine installation was assembled complete on the blocks where a test had been run. The set-up appeared to be very crude, with steam pipes lashed in place, but there were sufficient gauges, recording instruments, and breaks to run a proper test. One complete rotor was on a testing stand for balancing. The conducting officer stated that they had no balancing machine, but used only a "method of weights."

Boilers.—Twelve Yarrow, straight-tube, express type of about 10,000 horsepower each, with superheaters. Working pressure, 250 pounds. Boilers built complete in Yokosuka shops. Boiler work excellent.

Evaporation.—Vertical shell, single-coil type of Japanese design. The coil consists of composition tubing wound double in the steam element. For blowing down, there is a steam jet in the side of the lower casing. There is the usual large door in the side of the lower casing which is removable for pulling the coil for scaling. The steam coil is supported by two shelves which extend from the casing and on which rests the upper part of the coil.

Air pumps.—Usual type of vertical, single-acting, twin barrel; very massive and heavily built. One of these air pumps was observed completely assembled for block test of one turbine unit.

Fireroom blowers.—Steam, turbine-driven.

Circulators.—Rotary type, turbine driven.

Propellers.—Phosphor bronze, three blades cast en bloc with blading and hub in one casting. Diameter of screw about 14 feet. The excessive pitch was noted, it being estimated that the pitch ratio was at least 2 times the diameter. The size of the propeller, with hub and blades in one piece, indicates a high degree of skill attained in bronze castings. The fairwater or "foolscap" over the propeller hub was excessively heavy, being practically a solid casting with only sufficient part of it bored out to permit of tapering a heavy thread for securing to the propeller hub.

Shafting.—Four shafts about 22 inches in diameter.

NOTE.—The *Myoko* is one of four sister ships of 10,000 tons. These vessels will probably mount eight 8-inch high-velocity guns in four 2-gun C. L. turrets; two 4.7 A. A. guns, and 12 above-water torpedo tubes. They were designed for 33.5 knots and will carry four airplanes. None of these cruisers have been launched as yet.—ED.

5. Construction of destroyers.

According to the Japanese press, orders for the construction of four destroyers have been placed by the Japanese Navy Department, as follows:

Destroyer *No. 37*, at Maidzuru Navy Yard.
Destroyer *No. 41*, at Ishikawajima Dockyards, Tokyo.
Destroyer *No. 42*, at Fuji-nagata Dock, Osaka.
Destroyer *No. 43*, at Uraga Dockyard, Uraga.

NOTE.—These vessels are four of a class of 15 vessels of 1,700 tons displacement, developing 34 knots, with 39,000 S. H. P., and mounting six 4.7-inch guns and nine 21-inch torpedo tubes.—ED.

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6. Submarine "RO-31" launched.

Submarine *RO-31* was launched at the Kawasaki Dockyards, Kobe, on September 25, 1926.

NOTE.—*RO-31* (old *No. 70*) sank in Osaka Bay while undergoing acceptance trials. This submarine was raised, towed to the Kawasaki Dockyard, and broken up. The *RO-31* launched on September 25, 1926, is a duplicate of the old one. This vessel is of about 1,200 tons surface displacement, surface speed of 13 knots, mounts one 4.7-inch gun and four 21-inch torpedo tubes.

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7. Submarine "RO-18" collides with steamer.

According to the Japanese press, while engaged in local maneuvers off Kure Naval Station on September 28, submarine *RO-18* rammed from below water a 19-ton sailing ship and sank her off Cape Sata, prefecture of Ehime.

The submarine suffered damages to her bow and conning tower in the collision and had to put back to Kure for repairs.

NOTE.—*RO—18* is of 720/986 tons, 2,600/1,200 S. H. P., speeds of 18/10 knots and mounts six 18-inch torpedo tubes.—ED.

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8. Japanese naval vessels under construction September 1, 1926.

The following lists the ships under construction for the Japanese Navy:

AIRPLANE CARRIERS

Name	Where building	Expected date of completion	Remarks
Kaga	Yokosuka	Mar. 31, 1927	Sister ships, 27,000 tons, 29 knots; ten 8-inch and twelve 4.7-inch AA guns; 70 planes each.
Akagi	Kure	Dec. 20, 1926	

CRUISERS

Name	Where building	Laid down	Launching	Expected date of completion	Remarks
Kinukasa	Kawasaki, Kobe	Jan. 23, 1926	Oct., 24, 1926	Sept. 30, 1927	Sister ships, 7,100 tons, 33 knots; six 8-inch guns, twelve 21-inch torpedo tubes.
Aoba	Mitsubishi Nagasaki.	Feb. 4, 1924	Sept. 25, 1926	Latter part April, 1927.	
Myoko	Yokosuka	Nov. 25, 1924		Latter part March, 1928.	Sister ships, 10,000 tons' 33.5 knots; eight 8-inch and two 4.7 AA guns; 12 above water torpedo tubes; 4 airplanes.
Nachi	Kure	Nov. 26, 1924		do	
Ashigara	Kawasaki, Kobe	April, 1925			
Haguro	Mitsubishi, Nagasaki.	March, 1925			

DESTROYERS

Name	Tonnage	Speed, knots	Armament	Torpedo tubes	Date laid down	Date launching	Where building	Expected date of completion
No. 28	1,445	34	4, 4.7-inch guns; 2 machine guns.	6, 21-inch	March, 1925	May 25, 1926	Uraga	Apr. 30, 1927
No. 30	1,445	34	do	do	April, 1925	Oct. 6, 1926	Ishikawajima	(?)
No. 31	1,445	34	do	do	June 15, 1925	May 15, 1926	Maidzuru	Nov. 20, 1926
No. 32	1,445	34	do	do	August, 1925	July 12, 1926	Sasebo	Latter part March, 1927.
No. 33	1,445	34	do	do	March, 1926		Uraga	
No. 34	1,445	34	do	do	November, 1925.		Fuji-nagata	
No. 35	1,700	34	6, 4.7-inch guns; 2 machine guns.	9, 21-inch	June, 1926		Maidzuru	
No. 40	1,700	34	do	do	August, 1926		Sasebo	

SUBMARINES

Name	Where building	Date laid down	Date launched	Expected date of completion	Remarks
I-3	Kawasaki, Kobe	Nov. 1, 1923	June 8, 1925	(?)	Sister ships, 1,970/2,400 tons, surface speed 20 knots; two 4.7-inch guns, six 21-inch tubes.
I-4	do	April, 1926			
I-21	do	October, 1924.	Mar. 30, 1926	Nov. 30, 1926	Sister ships, mine layers, 1,000/1,400 tons 16,5/9.5 knots; four 21-inch tubes, two 4.7-inch guns.
I-22	do	February, 1925.		Apr. 15, 1927	
I-23	do	June, 1925		Apr. 30, 1927	
I-24	do	April, 1926			
I-53	Kure	Apr. 1, 1924	Aug. 5, 1925		Sister ships, 1,400/1,700 tons, 6,000 B. H. P., 21 knots, surface speed; six 21-inch tubes.
I-54	Sasebo	Nov. 15, 1924	Mar. 15, 1926	Apr 29, 1927	
I-55	Kure	Apr. 1, 1924	Sept. 2, 1925	Nov. 30, 1926	
I-58	Yokosuka	December, 1924.	Oct. 3, 1925	Jan. 31, 1927	
I-63	Sasebo	Aug. 12, 1926			
Ro-	Kawasaki, Kobe	Sept. 25, 1921	Sept. 25, 1926		770/1,000 tons, speed 17.5/10 knots.
Ro-66	Mitsubishi, Kobe	December, 1925.		May 31, 1927	1,000/1,500 tons, speed 17.5/100 knots.
Ro-67	do	March, 1925	Mar. 18, 1926	Oct. 31, 1926	

9. Visit to Yokosuka and Nagaura Naval Stations.

a. YOKOSUKA

PLANT FACILITIES AND EQUIPMENT

While Yokosuka is a first-class yard and is capable of building the largest capital ships, it is surprising that this class and size of work is turned out with such apparently mediocre equipment. The shops and buildings are all of temporary construction, with wood or corrugated sheet metal. This applies to new buildings as well as those rebuilt after damage by the earthquake. The shops are poorly lighted, crowded, and machinery layout poor. It is evident that no money is being spent on improvement to the plant or its operation that is not absolutely necessary. There was no press in the forge shop large enough to forge heavy shafting, and it is believed that such work is done elsewhere.

Building ways.—There is one large building way sufficient in size to take the largest ship and two smaller ways for destroyers or submarines, one of which has not been put in commission since being damaged by the earthquake. This figure as to number of building ways was confirmed.

New construction.—Cruiser: *Myoko*—10,000 tons displacement on the ways.

Submarine: *I–58* was building in a dry dock; hull was completed without bridge or conning tower; not permitted to go sufficiently close to note any details.

Aircraft carrier: *Kaga* was in a wet basin. About 100 feet of her flying deck was visible from a distance of 500 yards.

AVIATION

One small machine shop was devoted to building airplane motors. Motors seen in process of machining and assembly were 12-cylinder U type with aluminum pistons and crank cases. Conducting officers would not state the type of motor except that it was of "Japanese design."

ORDNANCE

No ordnance material was seen in any of the shops visited. It is probable that batteries for the *Kaga* and *Myoko* were being assembled in a shop we were not allowed to see.

NAVAL VESSELS

Several old cruisers, small destroyers, and torpedo craft; battle cruiser *Kongo* anchored in offing. The *I–1* was observed alongside

a dock while passing in automobile. She had two periscopes extended, same general appearance as the ones in our S boats with small heads, one gun forward and one gun aft, apparently 4.7-inch; Lake type bow rudders, above water; cruiser bow; no clearing wires or radio observed.

b. NAGAURA

Upon completion of inspection of Yokosuka Navy Yard proceeded to Nagaura. This yard is accessory to Yokosuka but operated separately. Apparently of small capacity. Devoted to manufacture and storage of torpedoes, mines, aero bombs, medium caliber gunmounts, and the hulls and wings of airplanes. Immediately upon arrival we were informed that we would not be shown any buildings which had to do with mines or torpedoes.

PLANT FACILITIES AND EQUIPMENT

A manufacturing plant of small capacity. Buildings of permanent nature, well lighted, and machinery layout good.

Aviation.—Two shops for building and assembly of airplane wings and hulls. One plane inspected completely assembled, biplane, two pontoons, tractor type; Rolls-Royce 12-cylinder motor.

Ordnance.—Observed several 4.7-inch twin-mount gun slides for destroyers; slides cast in one piece. Recoil mechanism consists of one liquid cylinder and two spring cylinders for each gun mounted on top of slide.

There were several antiaircraft carriages in the shop for a gun between 4-inch and 5-inch caliber. Hand loading only.

A number of Lewis gun scarf rings under repair.

Visited a small shop for reforming cartridge cases. The cases seen were 4.7-inch, approximately cylindrical throughout their length, and much shorter than our 4-inch cases.

A small shop for assembly of aero bombs. There was nothing between a bomb of about 250 pounds weight and a considerable quantity of very small fragmentation bombs of about 25 pounds. They were all of the usual type of body and tail.

Naval vessels.—Three submarines of the third division, submarines *Ha–1*, *Ha–2*, *Ha–9*, *Ha–10*, in fourth reserve; not permitted to get close enough to observe any details.

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10. Marine corps.

The navy general staff has discussed the advisability of adopting the marine corps system in the Japanese Navy. During last year's maneuvers when the navy transported and landed at a certain point

detachments of the army there was great delay in carrying out the operations due to the army's lack of experience.

The general staff will shortly prepare a draft of the proposal and after obtaining the approval of the Navy Department will submit it to the army for their consideration. The expenses will be paid out of an army appropriation.

B. AERONAUTICAL

1. Manufacture of Rohrbach planes.

Some time ago the Mitsubishi Co. in connection with the navy purchased nine Rohrbach flying boats from Denmark with the idea of eventually adopting this type in case their experiments should prove favorable. After continued trials of this plane they have deemed it unsuitable to their needs and will no longer use it, and no more such planes will be purchased or manufactured.

NOTE.—See article under "Denmark" concerning Rohrbach plant.—ED.

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2. Manufacture of Lorraine-Dietrich engine.

For some time three French engineers have been employed at the Nakajima aviation manufacturing plant, teaching this factory how to make the 450-horsepower Lorraine engine. These engineers are now at Hiro, not only for the purpose of starting the manufacture of the new Lorraine engine, but also for the purpose of correcting the faults in the manufacture of the present one.

The 400-horsepower Lorraine engine has been manufactured for some time at Hiro, but these French engineers say that the construction has not been at all well done, and they are called in for the purpose of correcting mistakes now being made.

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3. Aircraft pilots.

[Source: Japanese press]

The navy has hitherto chosen as seaman pilots men under instruction in naval stations who showed excellent results, and has sent them to a naval air group to undergo the necessary training. It has now been decided that hereafter, at the time of collecting volunteers, those for flying duty will be set apart from the very beginning, as now are common seamen and artificers, and given proper training from the first term onward at the naval stations.

As a result of study as to which are the fittest as aircraft pilots—the boy, youth, and middle-aged man—it has been found that the age of from 16 to 19, the period in which physical development is

most vigorous, is suitable, and that it is necessary to give full training in aviation during that period. It has been decided confidentially that airmen shall be taken next year for the first time from among boy volunteers who have in the past been admitted only as telegraphists. Boy pilots have not yet been used by any of the armies and navies of other powers.

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4. French Army mission.

[Source: M. I. D.]

The Japanese War Office has invited a French aviation mission consisting of three officers for the purpose of instruction in the phases of aviation noted below.

One in ero-dynamics and airplane construction. This officer is not interested in the construction of airplanes but is for the purpose of consultation with reference to the two subjects mentioned. This officer will remain in Japan about six months.

One pursuit pilot capable of giving practical instruction in air fighting. This officer will remain about three months at Akenogahara and will show Japanese pilots by example the French system of fighting in the air.

One warrant officer mechanic for practical instruction in the field concerning the maintenance of engines. This officer is expected to instruct Japanese mechanics in the detection of engine faults by hearing, etc. (incidentally a subject in which the Japanese are quite deficient).

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5. "F–5" flying boat.

[Source: M. I. D.]

Mention has been made of the probable discontinuance of the manufacture of the Rohrback plane and the substitution of a modified and improved *F–5* flying boat. Details of this latter boat are not yet available, but it is said to be a metal monoplane with twin engines of 360 horsepower and of larger size than the original *F–5*, It is provided with a device which converts the machine into a sort of sailing boat equipped with radio, so as to render any emergency landing less risky. The plane will be known as the "*R*" seaplane.

NOTE.—Further details of this boat were given in the October BULLETIN.—ED.

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6. Trial flight of Mitsubishi "Tiger."

[Source: Japanese press]

The Mitsubishi Co., after improving their 1924 model attack plane and installing in it a 450-horsepower Hispano-Suiza engine, planned

to attempt a trial flight with first class pilot Nakao as pilot and technical expert Hori in the plane. It was planned to make a maiden flight from Kagamigahara, Kyushu to Omura, a distance of 533 kilometers, on the first day and from Omura to Morioka, 1,477 kilometers, on the second day, and from Morioka to Kasumigaura, a distance of 429 kilometers, on the third day. However, due to a forced landing at Kasumigaura the trial ended at that place. This plane was christened *Tiger* as the opposite to the hydroplane bearing the name *Goose*.

NOTE.—The Hispano-Suiza engine was adopted for Mitsubishi fighters in place of the recently developed Mitsubishi 500-horsepower engine.—ED.

7. *Airplanes on ships.*

The navy department has decided to place airplanes on all war vessels from light cruisers up. For this purpose 3,000,000 yen will be asked for in the 1927 budget.

It is proposed to place on capital ships one observation, one attack, and one reserve plane: on battle cruisers, two planes: on light cruisers and first-class coast-defense ships, one reconnaissance plane.

The light cruiser *Nagara* and other new vessels will have airplanes provided as these ships are completed.

8. *Dirigible "No. 5," No. 1 type.*

Dirigible *No. 5* made an experimental flight from Kasumigaura to Yokosuka in the middle of September, 1926. This dirigible was formerly the dirigible *No. 4*, "*No. 1 type.*" After being completely overhauled and gondola replaced it has been renamed dirigible *No. 5*, "*No. 1* type."

NOTE.—This ship was completed the first part of September. As *No. 4*, it was damaged last June.—ED.

9. *Construction of rigid airships in Japan.*

The Japanese Navy Department has no plans for the building of a large-size dirigible or semidirigible in the near future.

It is believed that they will not undertake any further expansion of their lighter-than-air equipment until they have had considerable experience with the *N–3* (sister ship of the Italian *Norge*) which arrived in this country August 25, 1926, and which is being set up at the present time.

10. Site for new airplane factory.

According to the Japanese press the Navy has selected a site adjoining the Oppama Aviation Corps, near Yokosuka, to build an airplane factory.

Under next year's appropriation it is expected to remove the airplane shops in Yokosuka Ordnance Factory to the new site.

At present naval planes are manufactured at the Mitsubishi Internal Combustion & Engine Co., Nagoya; Aichi Clock and Electrical Machinery Works (Ltd.); Hiro Navy Yard, Hiro; and the ordnance factory, Yokosuka, but the total building capacity of these places is short of the requirement.

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11. Creation of air department for Japanese Navy.

The following article appearing in the Kobe Chronicle of October 26, 1926, is quoted:

Strong support is being given by naval officers to the creation of an air department within the navy department. Admiral Takarabe, the minister, is said to be among the stoutest advocates of the proposal, and it is considered probable that the necessary estimate under this head will be made in the estimates of the navy department for the next fiscal year. The establishment of an air department was proposed by the naval authorities last year, but for financial reasons it was rejected by the financial authorities. The naval authorities contend that it was preposterous that while the army has a similar institution with a general or a lieutenant general as its chief, air matters in the navy are taken charge of by an officer of no higher rank than a commander.

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12. Ineffectiveness of the Army bombing.

[Source: Japanese press]

The authorities are greatly worried about the ineffectiveness of the bombing on the part of the army planes during the recent bombing of the fortress of Kojima in Shikoku. Although various explanations are being put forth by the army to explain this failure, still it has unexpectedly developed that, even in army circles, there is a group which advocates the revision of the aviation laws as they pertain to the army. This group is happy because this affair has strengthened their cause. In other words, they say that the cause of this failure on the part of the army bombers, rests with the authorities, by reason of the fact that there is insufficient training provided for the army air service, and that this is a source of great amazement in view of the responsibility of the authorities to make preparations for the so-called future wars. However, if this failure was the result of the above-described deficiency in training, it is

indeed a condition which must be rectified. As a matter of fact, the principal reason for the failure in this case lies in insufficiency of the aviation laws as regards the relations exercised upon it by the factors of personnel, finances, etc. It behooves the authorities to open their eyes to their grave responsibility in this matter and to cease their vain efforts to cover up an unsavory thing with explanations. At the present time, those in control in the aviation service, from the air bureau down through the regimental commanders, and in general those in high places in the army air service, all appear to have assumed the exclusive right of belonging to a heavenly appointed company, although they lack actual practical knowledge of aviation. The famous Lieutenant Colonel Tokugawa, who since the beginning of our air service has risked his life in aviation, has been given by these autocrats the insignificant sinecure of manager of the aviation research section, while Hino, Oka, etc., have been relieved from their present posts of duty, and all other of our actual aviators have been placed in insignificant and obscure positions. It is believed that it is easy to arrive at the right conclusion in this, that is, that these miserable elders, whose futures are not bright, in order to attract notice to themselves, interfere with the actual science of aviation consisting of maneuvering, bombing, firing from planes, etc., by including in the maneuvers and training of the air service conditions not to be met with in real service. As opposed to the navy, where actual aviators such as Lieutenant Commander Eimine, in charge of aviation training, and Lieutenant Commander Matsuei, in charge of aviation regulations, and Lieutenant Commander Umakoshi, Kawahara, and Iigura, etc., with very few assistants, compose the brains of the navy aviation, the army, as stated before, in addition to 256 persons without actual knowledge of aviation who compose the air bureau, has in the air bureau an aviation branch and in general staff headquarters an aviation section. As a result, the cost of maintenance of personnel is very great. For this reason the amount of money available for maneuvers and training is very small, the greater portion being needed for upkeep of personnel. For this reason, although it is recognized that study of the tactics of aviation is necessary, still if actual results in the advancement of tactics does not accompany this expenditure it is like pouring water into a rat hole. Formerly, at the end of the year 1921, there were three times as much time devoted to aviation in the army as was devoted in the navy; at the end of the year 1922, there was only twice as much time devoted in the army as in the navy; at the end of the year 1924 both services devoted approximately the same amount of time to aviation; and at the end of the year 1925, the amount of time devoted in the navy to aviation, far and away exceeded that

devoted to aviation in the army. As a matter of fact, because the army is to-day using the antiquated Salmson and Nieuport planes, it is far behind the other great powers of the world. Not considering this, only taking into consideration the fact that the brains of the army air service are without actual experience and are lacking in knowledge of actual aviation, it is seen that the root of the trouble lies in the fact that measures taken to regulate personnel and fix finances are not good. For this reason it is necessary that the Rubicon be crossed fearlessly and the ineffectiveness of the army aviation system be rectified at once. This is most necessary in order that the present misfortune of the army may be changed to future good fortune. Furthermore, it is the path which people who consider their country must choose.

NOTE.—Reports on the bombing of Kojima fort were given in the October and November BULLETINS.—ED.

C. MILITARY

1. Defenses of Tokyo Bay.

In connection with the coast defenses in the vicinity of Yokohama and entrance to Yokohama Bay, the following items of interest were recently noted:

The large gantry crane, which previously had been working at Southern Uraga, was noted as being employed in the installation of a large naval type gun at Futsu Point, latitude 35° 18′ 36″ N., longitude 139° 48′ 19″ E. From size and great length, it was estimated that this gun was probably of 16-inch caliber.

A recent severe explosion in latitude 35° 13′ 48″ N., longitude 139° 43′ 56″ E., discloses a large devastated area in which two guns, estimated at 16-inch, have been dismounted and are now exposed to view. It is thought the damage was done by the explosion of a magazine.

NOTE.—The above locations are in the area of defense of Tokyo Bay. It is fairly well established that this bay is protected by 16-inch guns.—ED.

D. MISCELLANEOUS

1. Shale oil.

According to the Japanese press, experiments on shale oil are satisfactorily progre sing at the navy's fuel research station in Tokuyama. The South Manchuria Railway Co. completed a series of experiments on Fushun coal before the end of last year with a satisfactory result. Tests were then made by the navy's experts at Tokuyama, who satisfied themselves that the oil obtained comes up to the navy standard with a certain quantity of Borneo oil added. With further refinement, the oil will, it is ascertained, fully

meet the navy's requirements. A conference followed, in which the naval and other experts took part, a full-size experiment being recommended with a 40-ton furnace. The oil actually obtained shows no difference from the fluid extracted when the 10-ton furnace was used. The present series of experiments will be completed in December, when, subject to the result, large-scale production will be arranged in consultation with the navy. The initial plan is to provide forty-eight 40-ton furnaces at an expenditure of 4,000,000 yen.

NOTE.—Because of Japan's lack of native oil, the Japanese Navy is making strenuous efforts not only to store great quantities of oil but to develop an oil supply which will make it independent of foreign-oil control and, if possible, of importation.—Ed.

YUGOSLAVIA

A. NAVAL

1. Activities and program of the Yugoslavian navy.

(Source: German press)

The ships of the Yugoslavian navy are partly of Austrian origin and partly of German. They are distributed as follows:

(*a*) In the Adriatic: 8 torpedo boats (Austrian) constructed in 1913–14, 250 tons, 29 knots, two 7-centimeter guns, two double torpedo tubes; 4 torpedo boats (Austrian) built in 1906–1908, 200 tons, 26 knots, four 4.7-centimeter guns, 3 torpedo tubes; 6 mine layers (German M boats), built in 1916–17, 600 tons, 14 knots, one 9-centimeter gun and one 3.7-centimeter gun; 4 mine sweepers (Austrian), 78 tons (old torpedo boats), and 10 small auxiliary ships without military value.

(*b*) On the Danube: Two monitors of 250 tons, 2 monitors of 450 tons, as well as a few smaller vessels without military importance. The Budget for 1926 provides for the acquisition of motor torpedo boats which are to be ordered abroad. In type they will resemble the Thornycroft boats (40 knots, 1 torpedo tube, 1 antiaircraft gun, and a light gun). The navy will have at least 16 airplane echelons which will be distributed over the harbors of the Adriatic coast (Spalato, Ragusa, Sebenico, Cattaro, and Antivari).

The navy has no ministry of its own but forms one of the 11 divisions of the War Ministry. The naval arsenal at Teodo is the only yard which can make repairs on war vessels. The technical personnel has all been derived from the arsenals in Fiume and Pola, which were closed in 1918. At the head of the arsenal there is a rear

admiral and a staff of two captains. There is a naval school in Gravosa for the training of the officers, and a naval academy in Kruz near Ragusa.

Personnel: Defense minister, General Trifounovisch; commander in chief of the navy, Vice Admiral Prica.

Active personnel: Two hundred and fifty-six officers, 2,000 noncommissioned officers and men.

In training great attention is devoted to the antisubmarine defense, shown by the acquisition of motor torpedo boats. The same careful attention is devoted to the training of the aviation personnel. Many naval cadets have been sent abroad for training as airplane pilots. The Naval Ministry which organized its own chemical division at the beginning of the year intends to send a number of chemists abroad this year for training.

NAVAL POLICY

In spite of the so-called friendly agreement with Italy represented by the treaty signed at Nettuno, the mutual relations are not of the best. The recent demonstrations in Croatia and Slavonia show that the populace repudiates this agreement and that it in no way cements the foreign political relationships. The regulations regarding the unlimited freedom of colonization, of acquisition of ground, especially regarding the extraterritoriality of all employees of the Italian Consulate appear as a direct menace of the Yugoslavian coastal districts, and it is therefore comprehensible that this agreement be viewed as a wedge furnished the Italian Government in their efforts toward extension, and which it will be well understood how to make use of. The situation is not made any better through Albania with its strong Italian proclivities. The fear has also been increased that Italy will bend every effort to obtain the possession of the Dalmatian coast. In view of conditions it would be quite natural if all means were concentrated in order to defend the coasts, the main burden falling on the navy. One can not say that more has been done than has been absolutely necessary. Yugoslavia, which at the time of the signature of peace was promised the Austrian war vessels taken over by it, saw itself robbed of its best ships through no fault of its own; apparently this armament would have been too much for the young state. The Yugoslavian Navy at present is a pitiable affair, lacking all real vitality and with no actual military value either in personnel or material. It has been impossible to retain and keep up the capture l material. Perhaps this is due to the unequivocal recognition of the hopelessness of the affair, since the development of a naval power with which Italy also would have to reckon would be beyond the

power of the country in every way. If no changes have been made on the old ship material in recent years, this is also explained by the fact that the opinions regarding the necessity of a stronger navy are all the more divergent since the development of aviation appears to have furnished the opportunity of turning over to this arm the main tasks of coastal defense. The development of the navy would prevent this, however, as the coast defense is the raison d'etre of the navy. It is therefore very doubtful whether the scheduled building program will be carried out even in part, or whether older submarines will be purchased from France, although at the time of the last discussions of naval affairs, the advantage of a certain number of torpedo boats and submarines was fully recognized. It is probable that the navy will be restricted to limited coast defense through the purely defensive military equipment of the country.

NOTE.—In addition to the above craft already possessed by Yugoslavia, that Government has recently contracted with Thornycroft for the construction by the latter of two 55-foot coastal motor boats, displacing each about 13½ tons. These boats will probably mount a small torpedo tube and one or two light guns.—ED.

LATVIA

A. NAVAL

1. Ships for the Latvian Navy.

[Source: English press]

Messrs. La Société Anonyme des Chantiers et Ateliers Augustin-Normand, Le Havre, France, have recently completed, for the Latvian Navy the mine-laying trawler *Imanta*, and her sister ship, the *Viesturs*, has been constructed by Messrs. La Société des Anciens Chantiers Dubigeon, Nantes-Chantenay. These vessels have now completed successful trials at sea and have been delivered to the Latvian Government. Both vessels have been built to the designs of Messrs. Augustin-Normand. The propelling machinery of the *Imanta* comprises two sets of 375-horsepower triple-expansion engines capable of giving the ship a speed of 14 knots. The radius of action of the trawler is about 1,100 nautical miles when steaming at a speed of 11 knots. The vessel carries an 80-millimeter Schneider-Skoda antiaircraft gun, and four Vickers machine guns. The crew consists of 3 officers, 6 petty officers, and 29 seamen. The *Imanta* and *Viesturs* form part of a contract, which also includes the submarines *Spidola* and *Ronis*.

The submarine *Spidola* was successfully launched on October 6, last, at Le Havre, by Messrs. Augustin-Normand. This vessel has

been constructed to the designs of the Ateliers et Chantiers de la Loire, Nantes, who have the main contract; she is a sister ship of the *Ronis*, which has been built at Nantes by the last-named company. The *Spidola* has a length of 180 feet, beam of 15 feet, and displacement of about 400 metric tons. The surface propelling machinery comprises two 650-horsepower Diesel-Sulzer-Loire motors, built at the St. Denis works of the Ateliers et Chantiers de la Loire, giving the vessel a speed of over 14 knots. When submerged the submarine is propelled by two 350-horsepower electric motors, which will give her a speed of 9 knots.

The surface radius of action of the *Spidola* is about 1,600 nautical miles, and 85 miles when submerged. The hull has been designed for a depth of 164 feet. Two periscopes are provided which can be used when the vessel is at a depth of 36 feet. The armament of the submarine comprises six 450-millimeter torpedo tubes, four of which can be trained. In addition, the vessel carries a 76-millimeter antiaircraft gun and two machine guns. The crew will consist of 3 officers and 28 seamen.

MEXICO

A. NAVAL

1. Purchase of warcraft in Germany.

An article appeared in the Berlin "Tagliche Rundschau" of September 22, 1926, stating that the Mexican Government had ordered the construction of 10 gunboats and 10 coast guard vessels of 260 tons each at a German shipyard, which were to be delivered within two years. It reported further that 10 seaplanes had also been ordered in Germany, and that a German firm had been intrusted with the harbor extension work at Vera Cruz. A large part of the latter work is stated to be a shipyard and dry dock with a capacity of 1,500 tons, the costs of which will amount to 3,000,000 pesos (about $1,500,000).

The Krupp Germania Werft was recently visited and in conversation with one of the directors of the company, the subject of this newspaper article was brought up. He stated that the Mexican Government had been negotiating for the construction of 10 coast guard vessels with three German firms: The Krupp Germania Werft, Kiel; the Schichau Werft, Elbing; and the Danziger Werft, Danzig. He said that the negotiations had not yet been completed and no contract had been awarded thus far. The director also said that the contract if awarded to the Danzig firm could be carried out in Danzig, but if awarded to the other two firms that the construction would have to take place outside of Germany. He could not tell anything further regarding the other items of the press dispatch.

2. *Naval commission.*

[Source: Mexican press]

Two Naval officers have been commissioned by the Secretary of War and Marine to endeavor to effect abroad the purchase of vessels which Mexico needs, subject to the plans which they are to present to the higher authorities. They have now left this capital and one is in Italy and one in the United States in the discharge of their missions.

The two commissioners referred to left for abroad with the object of ascertaining the best manner of acquiring coast-guard vessels, as this Government is thinking of buying two vessels of this type, as a first step, intending to slowly increase the number, according to requirements and to the condition of the national treasury.

These vessels will be used, respectively, on the coasts of the Gulf of Mexico and that of the Pacific, and will take the principal part of guarding these coasts, there being, in addition, smaller ones which will be used as auxiliary boats and which will also be purchased abroad.

The same commissioners are instructed to report concerning other naval vessels which might be acquired, particularly a school ship for the use of the naval school of Vera Cruz.

NETHERLANDS

A. NAVAL

1. *Dutch gunboats for the East Indies.*

[Source: English press]

The Netherlands naval squadron in the East Indies is about to be reinforced by two gunboats, or sloops of an interesting type. The *Flores* and *Soemba*, as they are named were built respectively by the Fijenoord and Wilton yards in Rotterdam, both being launched in the summer of 1925. They are intended for patrol service in East Indian waters, and in case of emergency to act as guard boats to the mine fields off Surabaya. The specifications laid stress on certain essential features, such as (*a*) extensive cruising radius; (*b*) robust and simple propelling machinery; (*c*) shallow draft—not more than 3.6 meters—with a view to river navigation; (*d*) handiness of maneuvering; and (*e*) roomy living quarters, adapted for long cruises in tropical waters. The military characteristics were to be: (*a*) An armament of three 5.9 inch guns and

one 3-inch gun, which would be sufficiently powerful to deal with torpedo boats, armed trawlers, or other small craft that might attempt to sweep up the defensive mine fields; (*b*) moderate protection, viz, a strong steel deck, an armored conning tower, and plating over the magazines; (*c*) a very complete system of subdivision. It was recognized that such protection would be of no avail against direct hits, but that is a risk which the gunboats share in common with large cruisers of the so-called "Washington treaty" class. A sea speed of at least 14 knots being considered necessary, the machinery was designed for an output of 2,000 indicated horsepower. The *Flores* on trial developed 2,086 indicated horsepower at 167 revolutions, equivalent to a speed of 14.987 knots.

In view of the heavy armament and other weights to be carried on deck, special provision had to be made for stability. The tasks of the designers in this respect was rendered more difficult by the stipulation that two of the 5.9-inch guns should be mounted forward, the second being superimposed to fire over the first. The principal measurements are: Length over all, 75.6 meters; length on water line, 74 meters; breadth, 11.5 meters; depth of hold, 6.30 meters, draft 3.60 meters; displacement, 1,683 tons. Owing to the moderate speed accepted it was possible to install engines of small dimensions, leaving sufficient headroom for the armor deck, which is also worked over the magazines and steering gear. The oil bunkers are so arranged as to serve the purpose of antirolling tanks, and their low position keeps the metacentric height within moderate limits. The scantling is strong, but owing to limitations of space the double bottom could not be extended beyond the machinery spaces, and even there it is not carried up to the turn of the bilges. To minimize the danger of fire, steel decks are worked throughout, and the usual teak planking has been replaced by a noninflammable material known as triolin. The propelling plant consists of two triple-expansion engines, each nominally developing 1,000 indicated horsepower, taking steam from four Yarrow small-tube oil-burning boilers, fitted with Howden's system of forced draught. The twin propellers are three-bladed, with a diameter of 8 feet 2 inches. The rudder is of the Flettner type. The new Dutch gunboats are the first vessels of war to be equipped with this pattern of rudder.

The vessels appear to be admirable craft for their purpose, and the designers have succeeded in endowing them with powers of offense and defense well above the average for ships of such limited displacement. The armament is heavy enough to make them formidable antagonists even for a light cruiser, while the protective deck and the armored conning tower, which account for 225 tons of the total displacement, would enable them to stand up to the fire of medium-

caliber guns without undue risk. The equipment includes paravane sweeps for clearing a path through hostile mine fields.

NOTE.—The displacement of these craft is 1,670 tons. They arrived in the Dutch East Indies the first part of October.—ED.

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2. *Construction of two destroyers.*

[Source: English press.]

After inviting tenders, the Dutch War Department ordered from the Fyenoord Shipbuilding & Engineering Co., Rotterdam, the construction of two torpedo-boat destroyers, for service in the Dutch East Indies. Each vessel will have a displacement of 1,650 tons, and will be propelled by two sets of Parsons turbines, developing 31,000 s. h. p. Steam will be supplied by three high-pressure Yarrow water-tube boilers with a total heating surface of 3,250 square meters.

NOTE.—These two boats were authorized in the naval estimates for 1927 given in the November Bulletin. A total of eight of these boats are to be built in four years. A description of two now building was given in the October Bulletin.—ED.

B. AERONAUTICAL

1. *Naval air stations at De Mok and De Kooy.*

De Mok is a naval seaplane station located on the south side of the island of Texel. This station was erected during the war and is now used only as a training station for seaplane pilots and observers for the Dutch East Indies. It is about 30 to 40 minutes by boat from the Helder, and in bad weather and during the winter, boating is difficult. There are no quarters for married officers, so these officers live at the Helder and make the trip back and forth daily. Admiral Fock made the statement that he could not imagine why the station was ever located on the island of Texel, but now that it was there they had to use it, as the Government would not provide another site at the Helder.

The present policy of the Government is to do away with seaplanes in Holland and use only land planes for coast defense.

There were about 100 men and 20 officers at the station. The living quarters for officers and men are comfortable and ample. Fresh water is obtained from artesian wells. There is one large hangar and a small repair shop. The whole is capable of rapid expansion in time of war. However, the present departmental plan is to concentrate all naval seaplane activities at Schellingoude in time of war. Except with an easterly wind, it is necessary for the planes to taxi out through the channel, about one-half mile, and take off in the open sea.

There are 20 old Van Berkel W. A. (Brandenburg) type float planes, engined with BMW 185 horsepower engines; all used for training purposes.

De Kooy is situated near the Helder. This station is used for the preliminary training of all naval pilots. There is an excellent flying field, six hangars, complete workshop, and necessary administrative and living quarters. A seventh hangar is to be built this year. It is not considered an operating station, but solely a training station. However, there is maintained a squadron of six Fokker single-seater fighters and a division of three similar planes. This squadron was exercising during this visit, and the maneuvers and formation keeping were excellently done.

The station is under the command of Commander Heeris, a non-flier, who formerly commanded the station at De Mok. He is an enthusiastic officer with a decided "punch."

The shops are complete in every detail and capable of building a new plane, except for the engines. The commanding officer stated that he built planes complete, but of course had to refer to them as rebuilt planes. This scheme is probably resorted to because money for new planes is hard to get, while sufficient funds can be obtained for overhaul work. They also make all their propellers.

The arrangements for night landing are efficient and, from the statement of the commanding officer, entirely satisfactory. There are four large reflectors of 50,000 candlepower distributed about the field. The lenses are so made that the beam is horizontal about one meter above the ground and about three meters wide. The rays are not deflected upwards or downwards but lie as a horizontal plane.

The following is a list of planes at this station at the present time:

No.	Type	Description	Engine
17	Fokker DVII	Single-seater scout	BMW, 300 horsepower.
11	Fokker CI	2-seater training	BMW, 185 horsepower.
18	Fokker GIII	do	Mercedes, 120 horsepower.
2	Pander	No good.	
18	Fokker CV	2-seater reconnaissance and light bomber.	Hispano-Suiza, 450 horsepower.

NORWAY

A. NAVAL

1. Summer maneuvers, 1927.

The War Department has made the following proposal regarding the maneuvers for the ensuing summer half year:

Training to be held from beginning of April until middle of May, during which time the men will be quartered on board the

Tordenskjold (armored coast vessel) and *Eidsvold* (armored coast vessel). After May 15, the *Tordenskjold* will be used as a cadet ship for a four-months' cruise. Torpedo training will be held from May 15 to July 1. From July 1, the torpedo boats *Trygg*, *Stegg*, and *Snogg* (all of 220 tons, 25 knots, built in 1918), and the mine layer *Froeya* (760 tons, 22 knots, 100 mines) will be equipped for about three months. Three submarines will be equipped for the whole of the summer half year.

NOTE.—It is the policy of the Norwegian and Danish Navies to keep their vessels in commission only during summer training periods. The *Tordenskjold* and *Eidsvold* are old coast defense battleships of 3,800 and 4,160 tons, respectively.—ED.

POLAND

A. NAVAL

1. Polish Navy.

[Source: German press]

There have been so many reports regarding the increase in the Polish Navy that the actual status and the new building program are given herewith:

a. Seagoing ships.—These ships are divided in two divisions, namely, the I Division (torpedo-boat division) and the II Division (training division). To the I Division belong five former German torpedo boats (one V boat and four A boats). Another V boat was destroyed in the summer of 1925 through a boiler explosion. The II Division contains 2 gunboats (each 325 tons, built in 1920 at the Abo yards in Finland), 4 former German mine sweepers, 1 submarine of French origin, 2 tenders as well as an old 2,500-ton school ship (purchased abroad) without any military value, a survey ship of 300 tons, and 2 transports of 4,200 tons and 1,500 tons.

b. River craft.—The river flotilla (Thorn) consists of 2 monitors (70 tons, 9 knots) and two groups of 6 armored motor boats (60 tons, 16 knots). The river flotilla (Pinsk) consists of similar vessels but with 2 motor boats less. The auxiliary ship *General Sodnkowski* has joined the first division as a seagoing ship. It is a side-wheel steamer of about 200 tons, destined really for the river flotilla, but because it was too large for river service it was added to the ships listed under *a* as a mine and torpedo training ship in April of this year. Two river gunboats, *Krakowa* and *Wilno*, of 100 tons. These were built at the Zieleniewski & Co. yards in Krakau and were christened and detailed to the river flotilla only a short time ago.

Besides these vessels, the addition of the old French armored cruiser *Desaix* can be definitely counted on in the autumn. The

military value of this ship (known as an unsuccessful construction) is only very slight (7,700 tons, length 130 meters, beam 18 meters, draft 7.7 meters, armament eight 16.4-centimeter guns, four 10-centimeter guns, ten 4.7-centimeter guns; former speed 21 knots, built in 1901). The ship was purchased for 1.2 million francs and will be used as a training ship after some changes are made. The following will be added later: Two destroyers now under construction at Chantiers Navals Francais in Caen, and which will be given the names *Bourza* and *Wicher;* 2 torpedo boats, and the oft-mentioned six French submarines of the *Ariane* class. Whether all these vessels will actually be delivered remains an open question. It is possible that they will only be delivered later on when the harbor question is cleared up and sufficient personnel have been trained. However, all these plans are significant for the effort toward attaining naval prestige, an effort that has an energetic backer in France. Owing to the unfinished state of Gdingen, which will afford no suitable anchorage for a large number of war vessels for some time to come, it is quite comprehensible that the recent visit of Paul Boncour to Danzig should be taken as a preparatory step toward creating a military harbor at that place, which will be all the less surprising since the ammunition harbor of the Westerplatte was approved by the League of Nations, although Danzig may not be used as a military base for any foreign power.

RUSSIA

A. NAVAL

1. Naval strength in the Baltic.

When the Soviet Government took possession of the Imperial Fleet in October, 1917, it was understood that the Baltic Fleet consisted of—

7 battleships (called line-ships by the Russians).
9 large armored cruisers.
60 destroyers.
25 torpedo boats.
26 submarines.
5 gunboats.
8 mine layers.
70 trawlers and guard ships.

In addition, there were a great number of school and auxiliary ships. Under construction there were 4 battle cruisers, 2 light cruisers, 8 destroyers, and 6 submarines. This fleet suffered various losses during the revolution, and when the Soviet Government really

began to reorganize their fleet in 1922 a great many of the foregoing ships were no longer available. Among the losses it may be mentioned that Great Britain took two destroyers in December, 1918, at Koksskär, viz, the *Avtroil* and *Spartak*, which were shortly afterwards turned over to Estonia. During the summer and fall of 1919 the British destroyed the cruiser *Oleg*, the destroyers *Gawriil*, *Konstantin*, and *Swoboda*, the submarine *Jorsch* and the submarine mother ship *Pamjatj Asowa*.

Upon further inspection of the combat effectiveness of the fleet, the Soviet Government saw fit to sell a number of ships to Germany, Holland, and Denmark for scrapping, inasmuch as the condition of their own wharf and dry-dock facilities did not permit this to be done. During the years 1922–1925, according to this program, the following ships, and perhaps others, were sold to foreign powers for scrapping:

Battleships *Andrej Perwoswanny*, *Imperator Pawel I*, and *Cesarewitsch*; the cruisers *Admiral Makarow*, *Bajan*, *Bogatyr*, *Diana*, *Rossija*, and *Gromoboi*, as well as the former imperial yachts *Standard and Poljarnaja Swesda*.

The Russian reports regarding the present condition of their ships are very contradictory and meager. The seagoing ships are all old material which have been conditioned in an emergency. The reports hinting that several small submarines are under construction in domestic yards and will be soon ready for service appear very doubtful. The number of serviceable ships is much less this year than last, as the cruises last year showed a portion of the vessels to be useless, and reductions have had to be made owing to the economic policy now in force. The Black Sea Fleet and the war vessels at other stations are so negligible in numbers and quality that they can be disregarded. There are very grave doubts if the ships of the Bizerta squadron can ever be reconditioned, should they ever be turned over to the Russians. If all the ships of which there is a possibility of use, are counted, we obtain the following:

Battleships, 4 (*Marat*, *Parischkaya*, *Gangut*, now *Oktyaberkaja Revolutsiya*, *Poltava*); Cruisers, 3 (*Rurik*, whose condition is very doubtful; *Aurora*, now *S. S. S. R.*; *Svetlana*, now *Profintern*); gunboats, 3; destroyers, 16; submarines, 9; schoolships, 3; mine sweepers, 46; mine layers, 4. A certain number of auxiliary craft, including several survey ships and 11 ice breakers.

The four partially completed battle cruisers of the *Borodino* class which were to be converted into battleships have become so neglected in the meantime that any further use is out of the question.

Of the above-mentioned ships, according to the following reports, there are ready for service at the present time—

(*a*) According to a German report:

2 battleships (*Marat* and *Parischkaya Kommuna*).

1 cruiser (*S. S. S. R.*).

6/8 destroyers; that is, two divisions of from 3 to 4 boats.

6 submarines, two divisions of 3 boats each.

Training ship for stokers and engineer apprentices, *Komsomoletz* (an 11,700-ton steamer), and about one-half of the mine sweepers and auxiliary craft.

(b) According to a Swedish report:

Battleships: *Marat* (formerly *Sewastopal*); *Parishskaja Kommuna* (formerly *Petropawlowsk*).

These two dreadnaughts have each a displacement of 24,000 tons and are armed with twelve 30.5-centimeter (12-inch), sixteen 12-centimeter (4.7-inch), and four antiaircraft guns. Their present speed is rated as between 17–19 knots against 23–24 knots formerly. They have a complement of 1,225 officers and men. New boilers have been installed in both. The two other ships of the *Petropawlowsk* class, the *Michail Frunse* (formerly *Poltawa*), and the *Gangut* (as yet not renamed) are at present in an unserviceable condition. Repair of the first-named ship has already been begun, and it is believed that the *Gangut* will be practically rebuilt.

Armored cruiser: *International* (the former *Rjurik*) has a displacement of 17,000 tons, with a present speed rated at 19 knots. It carried the following armament: Four 25.4-centimeter (10-inch); eight 24.3-centimeter (8-inch), and twenty 12-centimeter (4.7-inch).

Protected cruiser: *S. S. S. R.* (foremrly *Aurora*), now used as a training ship, displacement 6,800 tons and speed 19 knots. Its armament consists of ten 15-centimeter (6.9-inch) and twenty 75-millimeter guns.

Other ships: 16 destroyers, 9 submarines, and 3 gunboats, namely, the *Trotzki* (formerly *Ardagan*), 14 knots; *Lenin* (formerly *Kars*), 14 knots; *Krassnaja Swesda* (the former *Chiwinetz*), 11 knots, now in service as a gunnery school ship. A training ship, the *Komssomolez*, (the former *Okean*), 11,700 tons, twelve 75-millimeter guns, speed 19–20 knots. A mine-laying ship, the *Dewjatoje Janwar*, and 16 trawlers and guard ships.

(The newly rebuilt light cruiser *Profintern* (formerly the *Swetlana*) was removed from the Russian Baltic wharf in Reval in 1917 to Leningrad, where it was completed. In 1925 a trial run was made with this ship which proved unsatisfactory and shortly thereafter it was laid up.)

(*c*) *According to an English report:*

Battleships:

Paris Commune,

Cruisers:

Marat.

S. S. S. R.

Gunboats:

Krasnaya Zvezda	Four 4.7-inch, and antiaircraft guns.
Krasnoye Znamya	Do.

Destroyers and torpedo boats:

Engels	Three 4.7-inch guns, nine torpedo tubes.
Garibaldi	Four 4.7-inch guns, nine torpedo tubes.
Karl Marx	Do.
Legki	Two 3-inch guns, two torpedo tubes.
Lenin	Four 4.7-inch guns.
Metki	Two 3-inch guns, two torpedo tubes.
Pamyat Trekh Esmintsev	Four 4.7-inch guns, nine torpedo tubes.
Stalin	Do.
Trotski	Do.
Uritski	Do.
Volodarski	Do.
Zinoviev	Do.

Submarines:

Kommissar.	
Krasnoflotets	Eight torpedo tubes.
Batrak	Six torpedo tubes.
Rabotchi	Eight torpedo tubes.
Krasnoarmeyets	Do.
Bolshevik	Do.

Kommuna, submarine mother ship.

Orlitza, seaplane depot ship.

Trefolev and *Komsomolets*, training ships.

There are no definite plans for construction. The program laid out is not worthy of consideration owing to its unsuitability. It was entirely out of proportion to the needs and ability of the country. Outside of reconditioning work and submarine construction of very small scope, nothing can be expected of the Russian dockyards for a long time to come. However, this does not mean that vessels can not be built abroad. The Russian papers report with their customary exaggeration that the following vessels have been ordered in Italy: Four cruisers, 8 destroyers, 2 airplane carriers, 8 submarines, 4 gunboats, 2 monitors, all of which must be delivered by 1930. But it seems quite enough if the Italian yards deliver a few flotilla leaders for the Soviets (of the *Leone* type).

Anything more exceeds the financial ability of the country, and would only prove an expensive and useless white elephant for the Russians, owing to the lack of trained personnel.

(NOTE.—The above three summaries are closely similar in their main features. This much is certain, that the efficiency of the Soviet ships is very low, and many which they class as effective would undoubtedly be considered worthless with a primary naval power.—ED.)

2. Naval personnel.

As is known, it has taken a long time to rid the fleet of the old personnel. It can be stated that from the beginning of 1923 a great improvement has taken place in the navy personnel. Most of the personnel is now drawn principally from the communistic society of youths, "Komssomol." The members of this organization are obligated to complete their conscript service with the navy. The length of this service is four years. The new personnel are not very skilled in seafaring in comparison to the old Imperial navy personnel which mainly came from a class accustomed from childhood to the sea, such as fishermen and people who lived along the seacoast. Furthermore, political propaganda has been carried on in the present personnel and many privileges have been accorded, so that the necessary naval discipline has almost been impossible to enforce. This is illustrated by the criticism of the Baltflotts chiefs who effected the discharge of the chief of the navy, Sof, because of the poor showing made in the last maneuvers. It appears that he did not effectively insist upon the discipline which the former Imperial petty officers who had been called back to the service endeavored to establish, but took the side of the Komssomolzy in various issues and thus tended to disorganize the navy personnel. This constitutes the principal and greatest weakness of the present Russian fleet, even if they are now attempting to obtain a different type and better personnel.

Another great weakness is the lack of appropriate command personnel. The petty officers of the former Imperial navy, now designated as instructors, have come into favor again and have been invited to return to the navy and restore discipline. The Government hopes to save the fleet by taking advantage of their naval experience. They have not returned in any considerable numbers, possibly because they earn more money in their present work and also possibly their present duties are less arduous. Those who have returned are confronted with the opposition from the various youths' societies. This opposition must first be overcome. New petty officers who are capable have not been developed as yet. The same is also true of the commissioned personnel. The army, especially the staff, has a relatively large number of former professional officers under the Czar regime who have returned. Their authority and skill is respected, particularly as Trotzki sponsors them. Thus they

progress with their work. The navy suffers in comparison with the army in this respect. The great mass of naval officers have become emigrés. In addition, it may be added that these naval officers, because of their training, have found it more advantageous to settle in foreign countries, and in a number of cases have found honorable assignments in foreign fleets. The present war commissar, Woroschilow, who perceives that the navy command has not been able to fulfill its duty and for the present could not be replaced by old experienced naval officers in Russia, issued an invitation last February (1926) to the emigré naval officers to return and enter the Soviet Navy. He had little luck in this attempt and he has had to content himself with those naval officers from the old fleet, who now occupy the principal and most important technical positions. Even these officers can not be classified as among the best of the old navy. The present shortage of command personnel is enough to counteract the magnified rumor that the Red fleet is well manned by former officers and petty officers of the German Navy.

But, in spite of these handicaps, it must be borne in mind that the deficiencies of the Russian Navy are gradually being overcome and that the personnel certainly will become much better, especially if the new spirit which is now shown may be permitted to continue. It seems that this will be the case and evidence of it is the discharge of the chief of the navy, Sof, which has very recently occurred.

His successor, Miklewitsch, is a supporter of the present Soviet Union's leader, Stalin, at least for the present. The latter permits himself to be openly lead by the opportune ideas. He desires to maintain the communistic party's power in the Soviet Government, even if he must sacrifice principles which have so far been considered inviolate. This will stand in good stead for the navy and its development.

Another interesting system has grown up relative to naval and military organizations. Under the Czar's régime it was customary to appoint a grand duke or a grand duchess to the honorary command position of the regiment or as a guardian for some organization, who would be interested in the welfare of the unit. The Soviet Government emulated this custom by appointing a large factory or trust organization in the same capacity for a troop unit or a similar organization, which provides this unit with food and other necessities, guards its interest with the Government and so on. They are referred to as chiefs. Even if these honorary appointments have now lost their importance, inasmuch as the normal system of supply has been introduced they nevertheless continue to be very beneficial as contacts between the people and the units assigned. In this manner the whole war industry and especially the chemical warfare and aviation have received powerful assistance and the country's

interest has been aroused in their questions, and thus their issues and problems are kept alive. By this system collections and obligatory pay deductions have been made and these are sources of procurement of necessary equipment.

Even the Baltic fleet, which the Russians call "Baltflott," has its so-called honorary chiefs. These representatives of factories, trusts, and firms are invited to attend maneuvers, to participate in them, and become acquainted with the personnel in its work. Afterwards these representatives carry on a propaganda throughout the country for the fleet by public speeches, or, as happened in a recent maneuver, public criticisms.

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3. Operations and policy.

[Source: M. I. D.]

A Swedish observer in Russia recently published an article in Sweden of which the following is an extract:

The official paper of the War Commissar, Krasnaja Zwejezda (The Red Star), recently published the following: "The naval personnel shall be trained by actual artillery fire, firing of torpedoes, mine laying and all sorts of maneuver in the open sea, reconnoissance and patrol service, attack by submarines and torpedo boats, mine-laying methods, and laying smoke screens. The technical training program includes all methods of naval warfare at sea and, in the defense of the coast, of cooperation with the land defense, sea-coast batteries and air service. Special attention will be paid to the intimate and complete cooperation between the navy and the air service."

While this official paper does not mention chemical warfare, it is known training for use in naval warfare has nevertheless been given. It is further stated in these instructions that whenever the fleet is out on maneuvers, either as a whole or in part, the personnel shall specially study the areas which might become areas of operations and to familiarize themselves with all other details so that deficiency in material against a strong enemy will be counteracted by his lack of knowledge of the waters and thus limit his ability to maneuver.

In another number of the Krasnaja Zwejezda is a brief statement of the methods of naval warfare which are being pursued. The Red Fleet must be thoroughly drilled in methods which are unknown to foreign fleets. It must overcome its technical deficiencies by skill in carrying on a minor warfare which demands, above everything else, initiative. If the fleet understands how to take advantage of the geographical character of Russia's coast line and come to a position where it can fully use these advantages in its movement, the enemy will necessarily be compelled to mobilize great naval strength. The Red Fleet can thus weaken and harass an enemy so that eventually it can come out and give battle and hope to gain a decisive victory. The final mission of the Red Fleet is that it is expected to play a very important rôle at the outbreak of the proletariat's revolution, inasmuch as it is exceptionally mobile and prepared for such war.

It is common talk that when the vessels already possessed are renovated, Russia will have a great preponderance of naval strength in the Baltic Sea which would be of utmost importance in any attack against the small

neighboring States of the Baltic, but that it could not make any decided opposition against the principal enemy. The principal enemy is England. This appears to be the reason for Moscow's effort to convert the Baltic Sea into a Mare Clausum and is also assigned as the reason for the frantic opposition to increasing the depth of the channel of Drogden as well as for the new system of mining in the Gulf of Finland and the development of the fortification system at Krasnaja Gorka. Likewise the same object is the cause of the increased activity in all the wharves at Petrograd and in the plants at Neva along the Baltic Coast, and at Krasnyi Sudostroitel. In short, it may be said that the naval authorities are following the same principle as the army in its development of means of highly movable warfare, such as light artillery, machine guns, and specially fast aviation squadrons.

The general staff is firm in its belief that at the outbreak of future wars there shall also be a civil war carried on in the enemy's country and it is for this reason that they deem it essentially necessary to have highly mobile forces to permit them to carry out sudden raids in conjunction with landings and thus establish contact with the local communistic groups in the enemy's country and assist them in carrying on revolutionary activities there. It is with this view one must consider the thoughtless words which are printed in the official mouth-piece ("Krasnaja Zwejezda") of the War Commissar.

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4. Caspian flotilla.

[Source: M. I. D.]

The following is a list of the vessels of the Caspian flotilla shown in the records as fit for service:

Destroyers: *Altfater* (former *Stavropolski*), *Markin* (former *Ukraine*), *Bakinskie Rabotchie* (former *Voiskovoi*). Displacement, 710 tons; speed, 17 knots (during 1926 trials); armament (after refitting), three 10-centimeter guns, one 37-millimeter gun, two M. Gs., two 45-centimeter torpedo apparatus. Eight torpedoes are carried.

Gunboats: *Nariman-Narimanov* (former *Kars*), *Krasnie Azerbaidzhan* (former *Ardagan*). Displacement, 900 tons; speed, 12 knots; armament, two 75-millimeter guns, four 37-millimeter guns, four M. Gs.

Guard ships: *Khorek*, *Kunitsa*, *Laska*, *Vidra*. Displacement, 180 tons; speed, 12 knots; armament, two 75-millimeter guns, two M. Gs.

Despatch boats: *Trud*, *Lenin* (former *Goek-tepe*), *Trotsky* (former *Astrabad*), *Ali-Bairanov*.

Trawlers: *Rosa Luxemburg* (former *Araks*), *Maxim Gorki*.

NOTE.—Probably only 25 per cent of these are actually effective.—ED.

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5. Flotilla of the Far East.

[Source: M. I. D.]

The following vessels were on the active list in May, 1926:

Destroyers: *Bravii* and *Boikii*. Displacement, 356 tons; speed (1925), 21 knots; armament, one 7.5 centimeter gun, five 4.7 centimeter guns, two 45 centimeter torpedo tubes.

Dispatch vessel: *Krasnie Vimpel.*

Trawler: *Inzhener.*

Armored vessels: *Lenin*, *Trotski*, *Sverdlov.* Displacement, 950 tons; speed, 11 knots; armament, *Lenin* two 15.4 centimeter guns, *Trotski* and *Sverdlow* two 12 centimeter guns.

Amur River gunboats: *Krasnoe Znamya*, *Bednota*, *Nadezhnill*, *Potekha.* Displacement, 190 tons; speed, 11 knots; armament, two 12 centimeter guns, two M. G. (*Krasnoe Znamya* and *Potekha* are in good condition.)

Mine Layers: *Trud* and *Ussuri.* Displacement, 3,200 tons; speed, 10 knots; armament, three 7.5 centimeter guns, four 47 millimeter guns.

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6. Repairs to submarines.

Alterations on the submarines of the Baltic Fleet were made as follows, in preparation for the navigation season 1926:

(*a*) Water-tight bulkheads fitted on five submarines.

(*b*) *Drzhevetski* torpedo apparatus was fitted on the *Batrak* and the *Proletari.*

(*c*) Antiaircraft guns were mounted on the *Proletari* and the *Krasnoarmiets.*

(*d*) The Diesel engines in several of the boats were in bad condition, notably in the *Batrak*, *Komissar*, and *Krasnoarmiets;* they have been repaired so as to serve for the time being.

NOTE.—All of the submarines mentioned above are of 650/785 tons, built in 1916 at Reval.—ED.

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7. Summer maneuvers of the Russian Navy.

The principal operating area of the Russian Fleet is the bays of Kaporja and Luga, in which the ships carry out their individual maneuvers. Outside of the two school ships *Aurora* and *Komsomoletz*, which made a practice cruise the beginning of August as far as the Kiel Bight, the other ships remained in Finnish waters until they left for a cruise to the waters in the neighborhood of the Swedish coast about the middle of August. Kamenew, the new general inspector of the naval forces, and several Moscow guests participated in this cruise which represented the climax of the summer maneuvers. The maneuvers consisted of offensive maneuvers of the torpedo boats by day and by night; the submarines also took part in this, but two boats collided and one of them had to be sent back to Cronstadt in a badly damaged condition. This is the first time that all the forces maneuvered together in close formation. The aviation forces, consisting of 12 squadrons of 5 airplanes each, also participated in these maneuvers.

The Baltic Fleet commander Muklewicz declared at the conclusion of the maneuvers that there was demonstrated a lack of preparation on the part of the commanders and a general lack of efficiency throughout the units participating. Inefficiency of artillery was noted, as well as the lack of discipline, among the sailors. To improve this condition new meaneuvers are to be held at the conclusion of the present exercises.

NOTE.—Further notes on the above maneuvers were given in the November BULLETIN.—ED.

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8. Military and naval administration.

[Source: German press]

Soff, member of the Revolutionary Military Counsel and commander in chief of the Russian naval forces, has been removed from his post and replaced by the former acting commander of the air forces, Mukliewitsch.

The reason for the sudden removal of the commander of the naval forces is principally the absolutely negative results of the recent maneuvers of the Baltic Fleet which have been the subject of sharp criticism on the part of the Russian press. The technical and mechanical installations of nearly all classes of ships were a total failure. Scarcely one ship could attain the prescribed speed, and serious machinery defects were the order of the day. It is impossible to express an opinion regarding the artillery performance, as owing to the many technical difficulties only very few could go into action.

Immediately after these maneuvers it was reported that there would be a complete reorganization of the administrative branches. This has now occurred and has also been extended to the army. It is now intended to make more extensive use of the special officers of the old Russian Navy. In the army the direct subordination of the military cadets to the chief administrative departments shows that the question of leaders is still a burning problem in the Russian army as well as in the navy. When the late commander in chief of the Red army, Frunse, announced over a year ago that the employment of former imperial officers could not be gradually decreased, it gave rise to serious apprehension in military circles, since the lack of well-trained leaders of the medium and lower ranks, together with the deficient technical equipment, is one of the weakest points of the Red army and navy.

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9. Addition to Black Sea Fleet.

According to a report from Bucharest, the rumor that 18 Russian warships of the Baltic Fleet would arrive in the Black Sea has

caused great uneasiness in Rumania. It is stated that the Russian Baltic Fleet will all be transferred to the Black Sea. France has only delivered the Bizerta Fleet to Russia on the condition that these vessels will not be used in the Black Sea. The Russians are keeping the promise but are transferring the Baltic Fleet to the Black Sea and will use the Bizerta Fleet in the Baltic.

NOTE.—There have been rumors to above effect for some time, but as yet nothing has been done. However, the above would be a logical step as Russian political activities are turning more toward Turkey and the East, and it is in this area and not in the Baltic that she might find the most use for her warcraft.—ED.

B. AERONAUTICAL

1. New type hydroplane.

[Source: M. I. D.]

A design for a new type of light hydroplane for scouting and photographic purposes was recently submitted by engineers Likoschin and Mikhelson at Leningrad to the chief air force directorate and to the staff of the Baltic Naval Air Forces, and instructions were given to the Junkers Fili Works (Moscow) to construct a machine of this type, the estimated price being about 16,000 roubles.

This machine is a modification of the small Besson hydroplane type "T. D. 35" and is specially adapted for small cruisers, or even destroyers. It can be dismantled very quickly and packed in a special wheeled box or a cylinder.

Specifications.—Length, 7 meters; height, 2.5 meters; span, 9.8 meters; depth of wing, 1.85 meters; wing area, 16.5 square meters; engine ("Salmson A. C. 9"), 120 horsepower; weight empty, 540 tons; weight (useful load), 225 tons; load per square meter of surface, 45.5 kilograms; load per horsepower, 6.4 kilograms; horsepower per square meter of surface, 7.3 horsepower; maximum speed, 163 kilometers per hour; maximum number of revolutions, 1850 per minute; cruising speed, 90 kilometers per hour; climb to 2 kilometers, 13 minutes; radius of action with two persons, 300 kilometers; radius of action with one person, 800 kilometers; time required to dismantle and pack, 6.3 minutes; time required to assemble, 6.3 minutes.

A special box for transporting this machine is 6.5 meters long, 15 meters wide, and 2 meters high.

The landing apparatus consists of two floats joined to a brace and by two struts connected with the center of the wing joints.

The body is rectangular and high, with perpendicular bevels in rear. The pilot's seat is in the center of the body, and the observer's

in rear to starboard. If an observer is not carried, an additional supply of petrol can be taken.

Under the pilot's seat is a closed receptacle for photographic apparatus. The basic material of the machine is wood, with wooden sheathing.

The engine is placed forward and is protected by a light metal cover easily removed.

The gas tank is placed behind the pilot's seat inside the hull of the plane.

The "Centaine" automatic starter is used. The wings are semirigid.

SPAIN.

A. NAVAL

1. Review of the Spanish Navy.

(By M. E. Delage in the Paris "Temps")

The directory, which, at its beginning in control of the Government, appeared to be going to realize important economies with the naval appropriation, is, on the contrary, entering on a vigorous naval policy. From to-day the Spanish Navy is in full transformation. To-morrow it will be a force in the Mediterranean to be considered. From its help or from its action may depend in the near future the maintenance or the destruction of the equilibrium of that sea, to which, by necessity, France is much attached. After the long years of inactivity which followed the Philippine disaster, Spain had formulated at the beginning of the World War a naval program which was voted in 1915 at the instance of Admiral Miranda. It included the construction of 4 fast cruisers, 6 destroyers, 28 submarines, 3 gunboats, and 18 patrol ships. The war prevented the realization of these ambitious plans. The construction of two cruisers was discontinued in 1919, but in 1924 two others were launched. They were the *Admiral Cervera* and the *Principe Alfonso*, which displace about 8,000 tons. Three years later, the light cruisers *Blas-Lezo* and the *Mendez-Nunez* of 4,710 tons entered the service. In 1923 the first destroyer of the new type was launched—the *Chacurra* of 1,650 tons. Six submarines of 915 tons of series C are still under construction. Six others, 555 tons, of type B, entered in service between 1920 and 1924. The armored units of the Spanish Navy are not very important, consisting only of the three small dreadnoughts, displacing 15,450 tons each—the *Alfonso XIII*, the *Jaime I*, and the *Espagne*, the launching of which took place in 1913 and

1914. The latter of these, the *Espagne*, was wrecked on the Riffian coast near the Cape of Three Forks in August 1923, and, notwithstanding serious efforts, could not be floated.

If in its actual state the material of the Spanish Navy is not fully developed, it is of good quality. The arsenals and navy yards have been modernized and specialized. The construction of large ships is effected at El Ferrol, and of small ones at La Carracca and Cartagena. Actually the Spanish naval construction is under the influence of English naval engineers. It was British technicians who directed the construction of the cruisers. The *Mendez*, for instance, had an English engineer aboard during her trials. The types of ships recall, by most of their characteristics, English models. The small armored ships are a reproduction of the old *Invincible*. The *Principe Alfonso* and the *Almirante Cervera* were constructed from the plans of the English engineer, Sir Philip Watts, who in these has slightly modified the British cruiser of class E. The *Mendez-Nunez* and the *Blas-Lezo* are designed from the *Caledon*. And, the *Chacurra* is almost an exact reproduction of the leaders of the British *Bruce* type.

Before taking up the matter of enlarging the construction program, Admiral Hororio Cornejo, the secretary of the navy in the Directory, bent his efforts toward obtaining from the organization at hand all that was possible. He suppressed or reduced the services which were not indispensable. Every important port had a hydrographic school; now there are only four. He cut down the staff of officers with fixed residence on shore and reduced the instruction division. The installations on land and the naval bases were perfected and developed. The navy yard at El Ferrol is well arranged. The Victoria-Eugenie basin has been made larger. The construction slip is to be enlarged and there is a second one projected. A new dry dock has been constructed at Cartagena—capacity 6,500 tons—and the material and supplies at this place have been reconstituted. The stores base at La Grana and at Mahon have been strengthened. At La Grana a wharf at which the large cruisers can tie up has just been finished. This base will be joined by a railway line to Betanzas where a new jetty head and tanks for oil stores are in construction. Mahon has recently become an important base for submarines. Here a jetty head has been constructed, and the warehouse on the jetty head of San Juan has been enlarged. A torpedo station has been installed on the island of Guarenta. In Cartagena the powder mills have been built and an appropriation made to secure a larger water supply.

The situation of the staff, which in the French Navy is precarious on account of recent laws and probably others to come, is satisfactory.

The effective strength of the Spanish Navy is 12,000 men. They are easily recruited at the rate of 4,000 men a year, among the 15,000 furnished by the maritime conscription, which functions along the coast in a manner similar to our own. The service is three years. The Spanish sailor is without much instruction, but disciplined, clean, and courageous. The specialists are in sufficient quantity. The reenlistments have not decreased as they have to an alarming extent in our country. They furnish a corps of graduated men, not very numerous, but of great value. They have much authority over their men and on board fill important places. On the larger ships the watches in the machine rooms are intrusted to them only; in many cases they are in direct charge of the entire engine-room watch, taking the part of officers. They are well recompensed, their pay running from 300 to 500 pesetas a month, with a subsistence allowance in addition. On the greater number of the larger ships they are entitled to privileges that their French comrades should envy. Their quarters are comfortable, and their tables are supplied with good quality of mess gear, all provided by the State.

Greater yet is the prestige and the comfort of the officers. All of them are coming from the naval academy, which they enter at the age of 15. The academy course consists of two years of theoretical study, one year of training, and one year as a midshipman on board ship. The officers are well paid, receiving as midshipmen from 500 to 1,000 pesetas and as ensigns from 750 to 1,500 pesetas. All subordinate officers receive a subsistence allowance of 250 pesetas per month. Their life on board is organized in a perfect manner. The State furnishes silver plate, linen, and mess attendants, all of which gives to their lives a comfort which is in contrast to the pale, almost poor existence, of the officers of the French Navy since the fall of the franc and the increased cost of living. However, promotion is slow, being attained only by seniority. The age of the commanders is from 45 to 50 years and that of captains is near 60 years. They are retired at 65. Commands are given at the turn of the list, hence all the commanding officers of ships are old men.

As the admirals are all aged, the duties in a command fall on the chief of staff, in most cases he assuming practically all the responsibilities of the command. This is not a very satisfactory organization, and it is without doubt that, to correct such a state of affairs, the Naval War College was inaugurated at Madrid on October 7, 1925, the object of which is to give to all officers a broader knowledge of the more modern methods of organization and a better general knowledge of naval science. The course is one year, consisting of nine months at the school and three months of practical studies on board ship or in foreign countries. A great number of the textbooks are translated from the French, among them being several by Captain Castex.

The ships are scrupulously clean, often superior, let us confess, to our own French vessels. The traditions of the old sailing navy have been kept. Decks are washed down from 4 to 6 and all cleaning and polishing is finished and the crew musters in dress of the day at colors. Notwithstanding this there is some doubt as to the actual military efficiency, for, though the artillery material is comparable to that of the English Navy, the training methods in target practice are not modern and leave a doubt in one's mind as to their efficiency.

While the program of Admiral Miranda should have provided Spain with a suitable navy, the Directory has hopes of going much further toward bringing that country back to a position as a naval power to be reckoned with. A decree was issued on July 3, 1926, the preamble of which contains the statement, "Spain to assert her personality and to continue to work to her historical destinies," etc. The project includes as one of its essential points the reconstruction of a naval force. The Minister of Marine, Admiral Cornijo, states that the program carries only strictly necessary expenditures, notwithstanding the fact that it carries with it an appropriation of 877,629,935 pesetas. This is to be divided into 10 annuities, commencing with the 1st of July, 1926; 85,000 pesetas are to be used for payments authorized under act of February 17, 1925, and act of January 11, 1922; 110,380,000 pesetas for new construction under act of March 31, 1926; 268,500,000 for the construction of three cruisers of the type provided by the Washington agreement; 50,000,000 for three destroyer leaders of the *Chacurra* type; 144,000,000 for 12 submarines of the C type; 11,000,000 for 2 oilers; 12,000,000 for purchase and construction of mine layers, mine sweepers, and patrol boats. The aeronautical stations of Cartagena, Mahon, and Vigo will receive large appropriations; 30,000,000 will be expended to put these stations in excellent shape with fixed installation, also for the acquisition of docks in Mahon and Rios. Spain before has been entirely dependent on foreign countries for her torpedoes, but in the future she will manufacture them herself; 78,000,000 pesetas will be spent in making this a national industry. The school of naval aeronautical application at Barcelona will receive 10,000,000 pesetas for perfecting of the aeronautical branch of the service.

Recapitulating.—The Spanish Navy will have started in its navy yards from the first of this year to the 1st of January, 1937: A cruiser of the *Principe Alsonso* type of 8,000 tons; 3 cruisers of 10,000 tons, *Washington* type; 6 destroyer-leaders of the *Chacurra* type; and 12 submarines. The auxiliary ships, mine sweepers and layers will be acquired, possibly in foreign countries, but all the balance of the program will be trusted to national industry and

arsenals. The average cost of construction for the last five years has been figured at 41,000,000, but the estimate for the future is 82,000,000—that is near 450,000,000 francs. France expended for her new construction in 1925, 340,000,000; this year she will spend 512,000,000. These figures show better than anything the naval effort undertaken by the Spanish Directory, and it will be approved by the public, because the maritime cause has made big progress in the last two years. The Spanish Navy League has developed itself, and the general staff edits a maritime revue, "La Revista General de la Marina," which constitutes a good instrument of naval information and propaganda.

It is probable that, under the whip of an energetic Government, proud of its latest successes, the Spanish people are going to realize their historical past and will make the necessary sacrifices, without hesitation to assure that their navy in the Mediterranean will take an important place. The reconstruction of the Spanish Fleet is a political factor that no one in France should be ignorant of. Within the next few years the strategical situation in the Occidental Basin of the Mediterranean will be without a doubt as follows: In the back ground, England will dominate it from Malta with its more powerful armored fleet, strengthened by the *Rodney* and the *Nelson*. In the center, the French Navy, obliged at the same time to assume the protection of the Atlantic frontiers, will defend the vital line Marseille-Algiers. It will be flanked on the east by the Italian Navy with a strength about equal to its own and on the west by a Spanish Navy in full revival.

NOTE.—The author is a French naval expert. The details of the naval law referred to above were given in the September BULLETIN.—ED.

SWEDEN

A. NAVAL

1. Naval construction.

The *O. H. Nordenskiold* was launched June 19, 1926, from Eriskbergs Shops, Gothenburg. Its over-all length is 91.4 meters, which is 4 meters longer than the armored ships of the *Aran* class and has a beam of 8.88 meters. The displacement is 1,050 tons. It is driven by de Laval's steam turbines which are geared to both propeller shafts; calculated speed 35 knots. The armament consists of three 4.7-inch guns (range about 19,000 meters) and two 40-millimeter automatic rifles, and six 18-inch torpedo-boat tubes arranged in batteries of three each. The contract for building this

ship was let to the Götaverken and was sublet by them to the Eriksbergs plant for building of hull. The ship was towed to the Götaverken wharf where boilers and machinery will be installed.

The *Nils Ehrenskiöld* was launched September 25, 1926, at Kochums shipyards at Malmö. It is to be fitted with three Yarrow boilers (oil burners), steam turbines calculated to give 26,000 horsepower. Its displacement is 974 tons and estimated speed 36 knots; otherwise, like the *O. H. Nordensiold.*

In August, 1926, a new motor torpedo boat (submarine chaser) was delivered to Sweden. It was built by the John I. Thornycroft plant, London, England. The water-line length is 16.2 meters, greatest width 3.4 meters, draught 1.1 meter, displacement 12.5 tons. It carries one machine gun and two 17-inch torpedo tubes. During a test run in October, 1925, it attained a speed of 41.4 knots. The ship has two motors capable of developing 375 horsepower each. Lieutenant Roberts, from the firm in England, made the delivery and supervised the initial instruction and trial tests in Sweden. Since then a second submarine chaser of similar type has been delivered.

On October 20, 1926, a new submarine, the *Draken*, was launched at the Karlskrona yards. No details concerning its dimensions are known except that it is the largest ship that has been built at the Karlskrona yards since 1898. It is stated that the building of the *Draken* was expedited in order to launch it early so the ways will be cleared for commencing the construction of a second U-boat, the *Gripen.*

(Another item, though not a Government activity, is the addition to the dry-dock facilities. On July 7, 1926, another section of the Götaverken new floating dry dock was launched. This dry dock can now handle its designed loads—that is, it can take ships up to and including 18,000 tons dead weight. Thus it can accommodate the new motor ship *Gripsholm*, and its planned sister ship, of the Swedish-American Line. The dry dock is to be placed just outside the new Dan Broström wharf. This wharf is practically completed and is equipped with two of the most powerful cranes in Sweden.)

The foregoing ships are acquired in accordance with the building program authorized by the Government in 1924. This program is for a five-year period. The estimated cost at that time was as follows:

	[1] Kroner
1 submarine	4,300,000
2 destroyers	14,000,000
4 submarine chasers	3,200,000
	21,500,000

[1] 1 kroner equals 26.8 cents; $1 equals 3.73 kroner.

These ships are to be completed at the end of the fiscal year 1928–29 (June 30, 1929).

In arguing this item of naval appropriations for the fiscal year 1925–26, new calculatons were submitted which showed that the costs had increased and that a change in the scheme had been made, namely, reducing the number of submarine chasers to two and increasing the number of submarines by one.

These new figures are:

	Kroner
2 submarines	8,800,000
2 destroyers	14,300,000
2 submarine chasers	620,000
	23,720,000

An attempt was made at this time to increase the number of new ships, viz:

	Kroner
2 destroyers	14,000,000
1 submarine	4,300,000

and to initiate the building, an additional 6,100,000 kroner was requested. This scheme failed to pass.

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2. *Naval activities.*

This summer there were five less ships in commission than the previous summer, namely, four destroyers and one gunboat. The principal maneuvers took place between May and the first half of August. The fleet consisted of 4 armored coast-defense ships, 8 torpedo boats, 2 motor torpedo boats, 11 submarines, 10 mine sweeping boats, 2 mother ships for aircraft, and several auxiliary vessels. Five airplanes took part in the maneuvers.

The summer maneuvers were held on the Swedish coast. On May 31 the armored coast-defense vessels *Sverige* and *Gustav V* went to Danzig; on June 24 the fleet was all in Karlskrona. At the end of June there were maneuvers on the west coast of Sweden in the proximity of Oere Sund. In the meantime the two ironclads *Manligheten* and *Tapperheten* visited Amsterdam, Portsmouth, St. Peter Port, and Vlaardingen. During July, the naval forces (34 vessels) visited Danish ports, Frederikshaven, Skagen, and Helsingoer. The schoolships *Najaden* and *Jarramas* which were commissioned the middle of May visited home ports and Nyborg, Libau and Hangoe. The schoolship *Af Chapman* left for a cruise to the Mediterranean, visiting the ports of Dover, Gilbraltar, and Southampton.

The following is the authorized organization of the Navy for the first half of the winter, 1926:

A.—Karlskrona Squadron:

One armored coast vessel division—

Sverige flagship (7,600 tons, four 11-inch, eight 6-inch guns).

Gustav V (7,900 tons, four 11-inch, eight 6-inch guns).

Tapperheten (3,800 tons, two 8-inch guns).

One destroyer division (560 tons each, built 1918)—

Wrangel, flagship.

Wachmeister.

One submarine division (about 800 tons each, built 1921)—

Illern.

Uttern.

Baevern.

Supply ship: Armored coast vessel. *Manligheten* (3,800 tons, two 8-inch, six 6-inch guns).

Guard boat: *Soekaren*.

B.—Stockholm Squadron:

Mine ship *Clas Fleming*, flagship (1,800 tons, four 4.7-inch guns, built 1914).

One destroyer division (460 tons each, built 1912)—

Hugin.

Munin.

One submarine division—

Hajen (about 600 tons, built 1920).

Valen (about 800 tons, built 1924).

Workshop ship *Blenda*.

Guard boat *Spraengaren*.

The cruiser *Fylgia* will be put into commission the latter part of October or beginning of November for a foreign cruise, and the *Svensksund* will be detailed to the protection of fisheries.

NOTE.—Sweden is now building two destroyers and one submarine. According to above, the following units will be laid up during the winter:

Drottning Victoria, 7,900 tons, four 11-inch, eight 6-inch guns. 1917.

Oscar II, 4,600 tons, two 8-inch, eight 6-inch guns. 1905.

Aran, 3,800 tons, two 8-inch, six 6-inch guns. 1901.

Wasa, 3,800 tons, two 8-inch, six 6-inch guns. 1901.

Dristighelen, 3,600 tons, two 8-inch, six 6-inch guns. 1900.

Thor, 3,700 tons, two 10-inch, six 4.7-inch guns. 1898.

Niord, 3,700 tons, two 10-inch, six 4.7-inch guns. 1898.

Oden, 3,700 tons, two 10-inch, six 4.7-inch guns. 1896.

6 destroyers.

27 torpedo boats.

12 submarines. —ED.

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3. Organization of Swedish Navy.

The armed forces of Sweden—army, navy, and aircraft—are represented before the King and the Parliament (Riksdag) by the

Minister of the Department of Defense, at present Gustav Rosen (Statsradet).

Table I shows the organization of the navy in time of peace. There is consequently no special head of the navy in time of peace. In war time, however, conditions are different to a certain degree. The commander in chief of the united forces will then be the King in the headquarters and his next in command as head of the navy will be the chief of naval staff in the headquarters, and as head of the army forces, the chief of the army general staff in the headquarters. (Organization of naval staff shown in Table II.)

The chief of the naval staff is at present Vice Admiral H. von Krusenstierna. There is no special deputy chief of the naval staff in time of peace.

The naval staff is divided in five divisions which handle the different matters—(*a*) naval intelligence division, (*b*) mobilization division, (*c*) communication division, (*d*) operation division, (*e*) organization division. There is no special chief of the naval air service since the army and navy forces are united.

The navy consists of the navy and the coast artillery. The navy is divided into two stations (Karlskrona and Stockholm) and two depots, the Gothenburg and Gustafsvik naval depots, belonging to the Stockholm station. The Gustafsvik naval depot, near Harnosand, is not manned in time of peace.

Commander in chief, Karlskrona—Rear Admiral Sparre.
Commander in chief, Stockholm—Rear Admiral Riben.
Chief of the dockyard at Karlskrona—Commodore Wester.
Chief of the dockyard at Stockholm—Commodore Gisiko.
Commanders of the coast fortresses are:
Vaxholms fortress—Colonel Bolling.
Karlskrona fortress—Rear Admiral Sparre.
Aelvsborgs fortress (Gothenburg)—Captain Noren.
Hemso fortress (Harnosand)—Major Falck.

In command of the naval academy and the naval college are:

Naval academy for naval officer and coast artillery officers—Chief—Commodore Unger
Naval College for midshipmen, coast artillery cadets and paymaster cadets—Chief—Captain Söderbaum

The commander in chief of the Coast Fleet is Rear Admiral O. Lybeck.

Representative at the League of Nations is Commander in Chief Rear Admiral Riben. Commander Biörklund attends as assistant.

Naval attachés are:

Berlin, Copenhagen, and Helsingfors—Commander Giron
London, Oslo—Commander Beck-Friis
Paris and The Hague—Commander Cassel (from May 1, 1927)

There are no naval missions.

The air forces of the army and navy were united July 1, 1926. The organization of this force has not yet been effected or even been determined in all its parts. At the head there is a chief, the chief of the air force, at present General-Major Amundsen. The latter is at the same time the chief of the administration of the air force which consists of three divisions, viz: (a) Military office, (b) technical office, (c) commissariat office.

The air force is divided into the following divisions:

First flying corps.
Second flying corps.
Third flying corps.
Fourth flying corps.
Flying school.
Two central aircraft factories.

The first flying corps will not be established until later on.

The second flying corps, comprising the material and staff of the naval aircraft, is at present stationed in Stockholm naval station and dockyard, but will later on be stationed at Västeras, where one of the central aircraft factories will be stationed.

The third flying corps is stationed at Malmen and Karlsborg. At Malmen is the other central aircraft factory.

The fourth flying corps will be stationed at Oestersund.

The flying school will be stationed at Ljunbyhed.

NOTE.—Organization of the Norwegian Navy was given in the October "Bulletin."—ED.

TABLE I. (NAVY ADMINISTRATION)

Carried out under His Majesty's order for the administration of technical and economic questions for the nation's sea defense in time of peace

Artillery division:
- Artillery weapons and inventories.
- Arms for personnel.
- Rifle ranges and target material.

Torpedo division:
- Torpedo equipment and inventories.
- Radio department.

Mine division:
- Mine defense.
- Sweeping and explosives.
- Telegraph and telephone material.

Nautical division:
- War preparedness.
- Training and maneuvers.
- Industrial mobilization.
- Navigation instruments and charts.
- Hire of ships.
- Troop transportation.

Fortification division:
- Construction, new building, and maintenance of sea coast fortifications

Engineering division:
- Construction, new building, and maintenance of ships and machines with accompanying inventories.
- Electrical equipment.
- Mechanical equipment.
- Technical questions concerning dock and station activities.
- Construction and manufacture of gun carriages.

Supply division:
- Commissaries.
- Clothing.
- Bed linen.
- Quartering.
- Receiving storehouse for accouterments and matériel.
- Coal, oil, and supply inventories.

Sanitary division:
- Sanitary and medical service together with appropriate supplies and inventories house.

Civil division:
- Navy's real estate.
- General manuscripts and written matter.
- Balances, auditing, and complaints.
- Other subjects of administrative judicial nature.

TABLE II. (NAVAL STAFF)

Preparation of plans for navy mobilization and war preparedness; plans for war and training; handles questions of organization—(*Chief of naval staff*)

Mobilization division:
- Mobilization.
- Conscript service.
- Coast artillery.

Operation division:
- The development and war preparedness of naval forces and coast fortifications.
- The subdivision and use in war time of naval forces.
- Instructions for commanders of naval forces and fortifications.
- War training.
- Tactics.
- Signal service.
- Guard service.

Communication division:
- Harbors and waterways.
- Coast geography.
- Coast signal service.
- Pilot service.
- Telegraph, telephone, and mail.
- Transportation.

Organization division:
- Navy organization.
- Plans for the fleet's training.
- Regulations and instruction books.

Foreign division:
Naval departments in foreign countries.
Research in historical works of naval warfare.

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4. Swedish merchant marine vessels for use in war.

[Source: Swedish press]

In connection with the law regarding the war organization of the industries, another law has been simultaneously passed regarding the selection of vessels for military use. Paragraph 1 of this law orders the owners of ships suitable for military service to turn same over to the navy when the latter is wholly or partially mobilized in return for compensation therefor. Paragraph 2 makes an exception of the following vessels:

(*a*) Vessels belonging to the Crown.
(*b*) Vessels registered in the Swedish volunteer motor-boat corps.
(*c*) Lifeboats belonging to the Swedish Lifesaving Society.
(*d*) Other vessels that might be exempted by the King.

In time of peace, the vessels are selected once every five years or oftener, if necessary, and for the execution of this task a special selection committee is appointed, which will submit proposals to the King, with whom the final selection rests. The said commission shall consist of six members, namely: One naval staff officer who acts as president and is appointed on proposal of the naval staff; one director for one of the naval dockyards or a naval engineer selected on proposal of the navy department; one army officer selected on proposal of the general staff; one official from the trade department on proposal of the said department; two representatives for commerce.

The commission has to meet at least once a year. The members are supposed to collect exact information of such vessels as are suitable for use in time of war and the commission is empowered to demand this information from the owners. A list of suitable vessels must be kept.

The law fixes the following duties for owners of ships: Notice to the commission of transfer of ownership, scrapping, extensive reparations and the like; obligation to deliver over vessels at fixed time and place and in good working condition when so ordered by the King; obligation to allow ships to be inspected.

B. AERONAUTICAL

1. The plant of the Svenska Aero Co.

The plant is situated at the water front of Skärsätra on Lidingon, an island on the outskirts of Stockholm. It manufactures planes

under license from the Heinkel Works, Germany. The plant is very small; consists of one end of the brick building shed of Gustafson & Andersen, motor-boat constructors. This portion of the building is rented from the owners and serves as the assembling and erecting shop, and, in addition, there are four rooms which are used for the construction of the wings and ailerons. The machinery equipment consists of about five lathes, planers, and cutting machines for woodworking. Outside of the above building is a wooden hangar capable of housing three planes. At present 30 men are employed, but they have had as many as 80. I was informed that the plant had been shut down for two years for lack of work, and was opened again about three months ago for the construction of two seaplanes for the Latvian Government. These are of the HE–type, each having one Rolls Royce Eagle motor, 12 cylinders, 360 horsepower. One of these planes is completed and in the hangar. The second is expected to be ready in about two weeks. The fuselage and wings are constructed of wood covered with fabric; the ailerons, however, are constructed of steel covered with fabric. The planes are of the three-seater pursuit type; forward seat for pilot, middle for radio operator or observer, and rear seat is fitted as a gun position. Carries two Vickers machines guns; one forward operated by pilot, and firing through propeller, being synchronized with propeller. The gun in the rear position is mounted on a ring with an all-around train, but can not fire directly ahead.

The plant has no other work on hand at present, but they expect an order in about two weeks for the construction of some seaplanes for Swedish Navy, HE–5 type. If this order is not received, the plant will be shut down again as no other work is in sight at present.

The plant is not manufacturing any planes for Japan. Was told that Heinkel (Warnemuende) built a number of seaplanes for Japan, and that the Aichi Tekoi Co. of Nagao has the Heinkel rights in Japan. In this connection it is of interest to note that two of the Japanese who were with Doctor Heinkel during the sea flight competition at Warnemuende last July, were from Nagao, Japan, and probably connected with this company. The director did not know how many planes had been manufactured for Japan by Heinkel, but thought that only three or four had been manufactured in Japan He said that he had been to Japan with Doctor Heinkel, and his impression was that while the Japanese were buying samples of a number of different types of planes they themselves were manufacturing planes on a very small scale only.

Was informed that the Swedish Navy had about 18 Heinkel planes and 9 of other types for purposes of comparison.

C. MISCELLANEOUS

1. Bofors Steel Works, Bofors, Sweden.

A visit was recently made to the works of the Aktiebolaget Bofors at Bofors, Sweden.

At present 1,500 men are employed. When going full force a total of 3,000 can be employed There was general complaint about lack of work at present, but during the afternoon when I called upon the general director he informed me that he had just received an order which pleased him very much, but the nature of which he did not disclose. They also complained that the orders received were usually so small that each called for special designing and construction; and that on account of competition there was not much profit in such orders. It is stated that the French steel companies at present are underbidding all other competitors.

There was not much work going on, and particularly there seemed to be no large lots of work under way except shells and fuses. In the shops were seven 12-centimeter (4.7-inch) guns, with mounts complete, which are for the batteries of the two new destroyers at present under construction for the Swedish Navy. There were a number of antiaircraft guns and mounts complete of 2.9-inch caliber (7.5-centimeter) for Sweden. Shells are being manufactured of the same caliber as the destroyer guns seen. A large number of clock-time fuses were being manufactured, and I was told that eight different countries were buying them. They cost 60 kroner each in lots of 10,000. The company claims that the ordinary time fuse actuated by burning powder does not function properly in high altitudes on account of the difference in temperature, which greatly changes the rate of burning at such altitudes. There was one mountain battery gun which seemed to be kept as a sample, and I was told that a large order of this type had just recently been delivered to Holland. The clockwork time fuse is German, undoubtedly Krupp, and is intended chiefly for use in antiaircraft shells.

A large number of whale guns were being manufactured. The company also makes 47-millimeter (1.8 inch) ammunition for automatic guns.

I was also shown their latest type fieldpiece antiaircraft gun. This is of about 5-inch caliber, and the interesting point about it is a new independent sighting mechanism. There are the usual telescopic sights for the pointer and trainer which are cross connected, but while the gun is trained by the trainer the pointer only directs his telescope on the target and does not operate the gun in elevation. To the right of the breech there is a follow-the-pointer system of dials by means of which the gun is laid in elevation by the gun layer

to correspond to the pointer's telescope and the angle of the elevation given by range indicator. The deflection is applied separately by means of a deflection scale. The loading of the gun is entirely independent of the sighting and does not interfere with a continuous aim at the target.

The guest register of the company's hotel showed that during the past year there were visits of commissions of Chile, Argentine, Russia, Bulgaria, Holland, Siam, Spain, Denmark, Turkey and Finland. The visits of officers from Holland were particularly frequent, from which it would seem that Holland had been the chief customer during the past year. I was told that commissions would come and order a few pieces for trial, and then perhaps sometime later an order would come for a larger order.

NOTE.—Bofors is one of the oldest as well as finest steel works in Europe and uses practically exclusively the high-grade Swedish ore. Its manufacture of military equipment is its principal activity but it also manfactures general steel products—castings, forgings, ingots, special treatment steels, etc.—ED.

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2. *Mechanical time fuses manufactured by the Bofors.*

[Source: Bofors Co.]

The mechanical time fuses replace the powder time fuses and conform to all requirements made on these fuses, in some respects even in a higher degree than those.

As the accuracy in time for the time fuse is dependent upon the regular burning of a powder composition, this fuse is highly dependent upon being well and dryly stored. Even when slightly moistened the fuse increases its burning time, it burns irregularly and when moistened in a higher degree it does not function at all. Not having any powder composition, the mechanical time fuses, which get their setting by means of a metallic clockwork, are not subjected to these unfavorable circumstances. The regularity in setting is much greater than by the powder time fuses. The balance wheel with stoppage used in the clockworks is so built that it is not easily influenced or hindered in its regular work through incidental influences or through the irregularity of the rotation or trajectory of the shell. On account of this arrangement of the balance wheel the setting may also be very accurately made, the limit, therefore, only being dependent upon the distance between the division marks on the graduated scale.

A much greater advantage of the mechanical time fuses is that they are independent of atmospherical conditions, as temperature, air density, and, above all, the barometrical pressure, which all have

a great influence upon the power time fuses. All these atmospheric conditions have no influence at all upon the normal and regular function of the mechanical time fuses. When these fuses are used the influences of these atmospheric conditions upon the trajectory, the expansion of powder, and the muzzle velocity and velocity of flight dependent thereupon are not, of course, eliminated, but are still there. Through the absence of the atmospheric influences in the mechanical time fuses the firing is highly facilitated.

The use of powder time fuses is limited by the rotation of shell, the atmospheric pressure, and, as regards the burning time, by the limitation of space for the placing of the powder composition. While the limitation in use because of the velocity of rotation of the shell only takes place in the smaller calibers, the limitation in use for the powder time fuse on account of too little atmospheric pressure holds for all calibers. These perturbations are most obvious in fighting against aircraft. When the altitude of flight exceeds four to five thousand meters, the present type of powder fuse is no longer reliable and they hardly function at all when this height is exceeded in an essential degree. Besides the low atmospheric pressure, the shells of antiaircraft guns of small caliber will also be subjected to the disadvantages of the rapid rotation through which the disadvantageous influence of the low atmospheric pressure is further substantiated. These two inconveniences are not inherent in the mechanical time fuses and only by use of these fuses is it at present possible to fight against aircraft at great altitudes; the powder time fuses having so great an error and great percentage of failures at high altitudes that it is impossible to get a reliable relation between the bursting point and the target.

The ever-increasing range of the larger calibers often requires ranging bursts. Such shots with regular bursts at a distance of 20,000 meters and more are on the whole only possible with mechanical time fuses. Every powder time fuse must fail here as, besides the long time of burning, there is also the great altitude. As a great dispersion may be expected when ranging with powder time fuses, subsequent firing will be impossible or at least absolutely ineffective.

SPECIAL ARTICLES

1. BRITISH EMPIRE CABLES

[Source: O. N. I.]

Great Britain has undisputed control of the cable situation of the world and has no competitor worthy of the name. Before the war Germany bade fair to make an attempt at competition with her, but

the war put an end to that, as all the German cables throughout the world were cut, rerouted to allied jurisdiction, or rendered totally inoperative, and it is difficult to see how Germany will ever be a dangerous competitor again.

In order to keep all parts of the Empire in close touch with each other and with the British Isles, and thereby make the Empire a closer unit, the British Government long ago realized the importance of the cable, and the British Empire cable network has been steadily growing ever since cables were first laid.

Two of the basic policies of the British Empire which have been steadfastly adhered to have been the establishment of naval bases and fueling stations throughout the Empire and linking together by cable all parts of the Empire.

The Government itself actually does comparatively little operating of cables and this only in recent years. However, the Government by subsidies and diplomatic assistance has helped the British privately owned cable companies to a very large degree, and the cable companies realize that they have the British Government behind them in any enterprise which they desire to undertake.

The total submarine cable mileage of the world in December, 1925, was approximately 323,422 nautical miles, and of this total 162,447 miles, or 50 per cent, was owned by the British. Of the 162,447 miles owned by British interests 18,158 miles were owned by British or Colonial Governments and the remainder by private cable companies. In addition to the above, 9,063 miles of cables, called the international system is owned by the British Government in conjunction with various European governments. The international system comprises a system of cables between the British Isles and Europe.

To show the magnitude of the British control of cables, the nearest competitor to Great Britain in the control of cables is the United States which, in December, 1925, owned a total mileage of 87,482 or about 27 per cent of the world total as against 50 per cent for the British. Of the 87,482 miles owned by Americans 25,567 was owned by the Western Union Co., the majority of whose cables are between the British Isles and North America. The North American ends of these trans-Atlantic cables all land in British dominions. Thus, out of 25,567 miles owned by the Western Union, 13,821 miles are laid between two parts of the British Empire, which in case of war between the United States and Great Britain would be of no value to us. Similarly, of the 22,387 miles owned by the Commercial Cable Co., another American company, 8,052 miles are between Ireland and Nova Scotia and Newfoundland and 5,834 miles more are between Ireland and Nova Scotia by way of a Portuguese possession (Fayal).

Thus, of the 21 cables crossing the Atlantic between Europe and North America 15 are owned by American companies, but whose American trans-Atlantic ends land in British territory, 2 are entirely British owned, 3 are French owned, and the other is an American-owned cable to the Azores which connects with a new Italian cable to Europe via the Mediterranean.

Thus the 87,482 miles owned by the United States dwindles down when that mileage which is entirely between portions of the British Empire is removed.

In the Pacific there are at present two trans-Pacific cables—one British and one American owned, but the British Government is in the process of duplicating its present cable from Canada to Australia, and the work will probably be completed in September of 1926.

The American-owned trans-Pacific cable has never rendered particularly good service and is not modern, whereas the new British Government's trans-Pacific cable will embody all the latest improvements in cable construction and sending apparatus.

Owing to a British-owned company's monoply in Brazil, no American cable company connects the United States with the east coast of South America except by running down the west coast, across the Andes mountains, and thence by land line to the east coast.

The Eastern Telegraph Co. is the largest and most powerful of all the British cable companies, and with its subsidiaries and associates its system owns and operates approximately 100,000 miles of cable and controls cable communications from the British Isles to the Mediterranean, East, South and West Africa, India, the East Indies, China, and Australasia.

The next largest British cable company is the Western Telegraph Co., with approximately 29,000 miles of cable, most of which is between the British Isles and the West Indies and the east coast of South America.

By a working agreement with the Great Northern Telegraph Co., a large Danish cable company, with 84,000 miles of cable, the Eastern Telegraph Co., uses the cables of this company for messages to northern Europe, China, Japan, and Russia in Asia.

Cable communications throughout the world by British-owned cable companies are as follows:

EUROPE

Government cables.—Eight cables to southern Ireland, 16 to France, 5 to Belgium, 4 to Holland, 6 to Germany, and 2 to Norway are owned and worked jointly by the British, Irish Free State,

French, Belgian, Dutch, German, and Norwegian Governments, respectively. These cables form the chief means of telegraphic communication between Great Britain and Ireland and western and central Europe and Norway.

Indo-European Co.—This company accepts messages for southern Russia and Turkey.

Eastern Telegraph Co.—Quintuple cables to Gibraltar—one touching at Vigo, two touching at Lisbon, and two direct, with a quintuplicate continuation to the island of Malta, from whence also a line extends to the island of Zante. There is a direct cable between Great Britain and Fayal (Azores), between Vigo and Lisbon, and between Gibralter and Villa Real (Portugal). From Zante a network of cables connects Otranto (Italy), Greece, Crete, Turkey, and most of the Greek and Turkish islands; also a cable connects Corfu with Trieste. A cable between Constantinople and Odessa is jointly owned by the Eastern Co. and the Indo-European Co.

Two cables from Marseilles to Bona and Malta and two from Pozzalo (Sicily) to Malta afford alternative routes between Malta and Great Britain.

From Lisbon (Portugal) the cable of the Europe and Azores Co. extends to San Miguel and Fayal in the Azores Islands. Other islands in the Azores are connected by cables belonging to the Portuguese Government.

A cable between London and Emden is owned by the Eastern Co. and the Deutsch-Atlantische Telegraphengesellschafe.

Belgian Telegraph Co.—A tricore cable between London on the one side and Antwerp and Brussels on the other is worked by the Eastern Co. and the Belgian Government, respectively.

Direct Spanish Company.—This company possesses two cables between Cornwall and Bilvac, in Spain, also a cable from Marseilles to Barcelona, the latter affording an alternative route between Great Britain, France, and Spain.

AMERICA AND WEST INDIES

The North Atlantic is crossed by 21 cables, 6 belonging to the Commercial Cable Co., and 3 to the Compagnie Francaise des Cables Telegraphiques. The cables of the Anglo-American and American Telegraph & Cable Co. now form parts of the Western Union system, which operates nine of the Atlantic cables, and the cable formerly owned by the Direct United States Cable Co. was purchased by the British Government, and forms, with the former German cable (from Penzance to Halifax), the Imperial Telegraph System.

The only means of telegraph communication with Bahamas is now by radio.

Telegrams for the West Indies may be forwarded by four routes, viz, (1) by the Pacific Cable Board's Turk's Island-Barbados, Barbados-Trinidad, and Barbados-Demerara cables; (2) by the direct New York-Havana circuits operated by the Western Union Telegraph Co., thence by land lines across Cuba or by the cables of the Cuba Submarine Co. along the shores of the island of Cuba, to Santiago, thence to Jamaica and Colon; (3) via Halifax and Bermuda to Jamaica, by the cables of the Halifax & Bermudas and Direct West India Cable Cos.; (4) by the Commercial Cable Co. of Cuba direct cable from New York to Havana and from Miami, Fla., to Havana. The West India & Panama Co.'s system, starting at Santiago de Cuba, embraces almost all the West Indian Islands, and extends from Demerara (British Guiana to Colon (Isthmus of Panama).

From Lima the cables of the West Coast of America Co. extend along the coast to Concepcion, calling at Callao and Mollendo (Peru), Arica, Iquiqui, Antofagasta, Serena for Coquimbo, and Valparaiso; a land line connects Santiago, Chili, with these cables.

The east coast of South America is connected with Europe at Pernambuco. Rio de Janeiro and Buenos Aires, the Western Telegraph Co.'s cables starting at Carcavellos (Lisbon) and Fayal (Azores) and joining up the islands of Madeira, St. Vincent, and Ascension with the above points in South America. Duplicate and triplicate cables also owned by the Western Telegraph Co. extend along the coasts of Brazil and Uruguay, with stations at Para, Maranham, Ceara, Pernambuco, Maceio, Bahia, Victoria, Rio de Janeiro, Santos, Sao Paulo, Santa Catharina, Rio Grande do Sul, and Montevideo. The cables of the River Plate Telegraph Co. and the Compania Telegrafico Telefonica connect Montevideo with Buenos Aires and Rosario de Sta Fé.

During 1920 a new cable was laid by the Western Telegraph Co. between Maranhao, North Brazil, and the island of Barbados, connecting at the latter point with the Western Union Telegraph Co. and its land-line system, thus affording direct communication between North and South America.

A cable connects Pernambuco (Brazil) with Monrovia (Liberia).

The Pacific & European Co., acting in conjunction with the Western Co. and the West Coast of America Co. has established a line of telegraphs between the Argentine Republic and Chili (Valparaiso), thus bringing the whole of the west coast of America into direct communication with Great Britain and Europe via Ascension Island and St. Vincent.

The Amazon Co. connects—by cable laid in the river Amazon—the city of Manaos, the capital of the State of Amazonas, with the city of Para at the mouth of the river; with intermediate stations

or branch lines at Pinheiro, Mosqueiro, Soure, Cameta, Antonio, Lemos, Breves, Gurapá, Chaves, Macapá, Alemquer, Monte Alegre, Santarem, and Obidos, in the State of Para, and Alemquer, Parintins, and Itacoatiara in the State of Amazonas. At Para the cable joins those of the Western Telegraph Co. and the land lines of the Brazilian Government.

AFRICA

Northern Africa is connected by the cables of the Eastern Co. from Gibraltar to Tangier; Malta to Tripoli; Malta to Bona and Marseilles (2); Malta to Alexandria (Egypt) (6); also Otranto (Italy) to Alexandria (Egypt) through Zante and Crete. Alexandria is connected to Port Said and also to Larnaca (Cyprus) by cable.

The Eastern Co. has land lines through Egypt from Alexandria, Port Said, and Cairo to Suez, from which place it has five cables to Aden, four of which touch at Port Sudan. Two of these cables go through Perim, while the other two go direct from Port Sudan to Aden. From Suakim land lines extend to Eritrea and Abyssinia, and Port Sudan is connected with the land-line system of the Sudan. The Eastern Co. works a cable from Aden through Perim to the French settlement Obock, for the French Government, and a cable connects Port Sudan to Djeddah, whence a land line extended to Mecca in the Province of Hedjaz. A wireless connection is established between Aden and Berbera (British Somaliland).

The Eastern and South African Co.'s cables commence at Aden and are laid along the East Coast of Africa to Durban, calling at Zanzibar, Mozambique, Quilimane, Beira, and Delagoa Bay, and in addition, the cable is duplicated between Zanzibar and Mozambique and a direct cable is laid therefrom to Durban. A cable from Aden to Seychelles is continued by the Eastern Co. to Colombo (Ceylon). At Zanzibar and the island of Pemba a wireless installation has been established. From Zanzibar cables extend to the islands of Seychelles and Mauritius, at the latter place joining up with the main cables between South Africa and Australia; Zanzibar is also connected by cable to Mombasa (where connection is made with the land lines of Kenya Colony) and to Dar-es-Salaam, from which town land line connections serve various places in the territory of Tanganyika. There is also a cable from Mozambique to Majunga in Madagascar belonging to the French Government connecting, with a land line, a number of inland offices in that island, including Tamatave on the east, where a cable lands from the islands of Re-Union and Mauritius. A wireless connection is made between Majunga (Madagascar) and Mayotte Island with further transmission to other Comoro Islands. From Laurence Marques there is a government land line in connection with those of the Transvaal Province,

and unites all the offices of the Union of South Africa, and to several stations in Portuguese territory as far north as Inhambane and Villanculos. The Eastern and South African Co. also own cables from Cape Town to Mossamedes, Benguela, and Loanda, where a junction is effected with the cables of the West African Co., thus affording a triplicate route via the West Coast with South Africa.

The Eastern Co. has a direct cable route from Cape Town (South Africa) to Great Britain, touching at the islands of Madeira, St. Vincent (Cape Verde), Ascension, and St. Helena; and in conjunction with the Eastern Extension Australasia & China Co. has continued the cable from Durban (Natal) to Perth (western Australia) and Adelaide (south Australia) (via Mauritius, Rodrigues, and Cocos-Keeling Islands), connecting by special wires Sydney (New South Wales) and Melbourne (Victoria), thus forming an all-British direct route between Great Britain, South Africa, Australia, and New Zealand, the latter being connected by two direct cables from Sydney to Wellington.

A special direct wire joins Cape Town to Durban. From Durban and Cape Town the Union Government land lines extend to stations established in all the provinces of the Union of South Africa. The Southern Rhodesian Government's lines continue the communication from the Cape border at Mafeking via Bulawayo to Victoria Falis, Livingston, and on, via Broken Hill (northwest Rhodesia) to the district of Katanga in the Belgian Congo Territory, terminating at Bukama; also via Salisbury to Umtali, and to Zintos on the border of southern Rhodesia; from thence the African Transcontinental Co.'s line extends via Tete (Portuguese territory), through the Nyassaland Protectorate, along the western shore of Lake Nyassa to Karonga. From Umtali the Beira Railway Co. takes the line to Macequece and Beira, at the mouth of the Punkwe River, where a connection is made with the Eastern and South African Co.'s cable station. There are also lines owned by the Portuguese Government, from Tete to Quilimane and Chinde. At Quilimane a junction is formed with the Eastern and South African Co.'s cables on the East Coast.

The ports along the West Coast of Africa are connected by the cables of the African Direct, West African, and Belgian Telegraph companies. St. Vincent, the starting place of the African Direct Co., is connected with Europe by means of the Western Co.'s cables from Lisbon via Madeira. From St. Vincent the cables extend to Bonny, calling at St. Iago (Cape de Verd Islands), Bathurst, Sierra Leone, Sekondi, Accra, and Lagos with a branch cable from Lagos to Kotonou, connecting at the latter place with the French Colonial land lines which extend to the French Guinea coast and join the cable system again at Conakry.

Numerous stations on the Gold Coast are connected by Government land lines from Sekondi and Accra extending to Lome and Little Pope in Togoland. Togoland is also reached by land line from Accra and by cable from Kotonou. A cable also connects Lome (Togoland) with Duala (Cameroons).

From Lagos the Nigerian land lines extend inland to many stations.

The West African Co.'s line is divided into two sections. The first starts at Bathurst, and connects Bissao and Bolama, and between Conarkry and Sierra Leone. The second section commencing at Bonny, touches at Principe and St. Thome, and terminates at Loanda, which is a joint station with the Eastern and South African Co.

The cable between St. Thome and Loanda also connects Banana (Belgian Congo Territory) by means of a T-piece, belonging to the Belgian Telegraph Co.

Cadiz, the starting place of the Canary Islands cables, is connected with Great Britain via Gibraltar and by the cable of the Direct Spanish Co. via Bilbao.

ASIA AND OCEANIA

There were two main routes between Great Britain and India, viz. those of the Eastern and Indo-European companies.

The Eastern Co.'s route passes through Malta, which is reached by quintuple cables through Gibraltar; thence by sextuple cables to Alexandria, land lines through Egypt, quintuple cables down the Red Sea to Aden, thence quadruple cables to Bombay, and a cable to Colombo (Ceylon). There is also a cable from Aden to Seychelles and thence on to Colombo. From the latter place the cable of the Eastern Extension Co. is continued on to Hongkong, touching at Penang and Singapore.

The Indo-European Co.'s duplicate leased lines crossed the North Sea, traversed Germany and Russia, to Teheran, in Persia. From this place the land lines are maintained by the Indian Government as far as Bushire, whence the Government cables are laid along the Persian Gulf to Jask and Karachi. There are two cables also from Bushire to Fao, one from Jask to Muscat (Arabia), and another from Henjam to Bunder Abbas.

The Government lines connect Bombay and Karachi with Madras and Colombo with the island of Ceylon, the starting points of the Eastern Extension Co.'s cables. The Eastern and Eastern Extension companies also work their own line direct between Bombay and Madras, and also between Bombay and Calcutta.

The Eastern Extension Co. own triplicate cables from Madras to Penang, also two cables from Colombo to Penang. At Penang the Federated State of Perak is connected, and land lines extend to the Malay States of Selanger, Sunje Ujong, and Jelebu. From Penang there is also a cable connecting Medan (Sumatra), joining the telegraphs of the Dutch-Indian Government.

There are five cables between Penang and Singapore, and two cables from Singapore to Batavia (Java), and one from Singapore to Banjoewangie (Java), and two cables from Banjoewangie (Java) to Port Darwin, and from thence the land lines of the South Australian Government across to the continent to Adelaide, whence land lines extend to all parts of Australia. Perth (Western Australia) is connected by cable with Durban (Natal) via the islands of Cocos-Keeling, Rodriques, and Mauritius, and also with Zanzibar via Seychelles, thus forming a triplicate route from Australasia to Europe via South Africa, via East Africa, or via India.

A cable from Cocos-Keeling Islands connects Batavia (Java) with the main line between South Africa and Australia, giving an alternate route between Australia, the straits, China, Japan, and the West. There is also a wireless installation at Cocos for signalling with passing ships.

The duplicate cables between Sydney (New South Wales) and Wellington (New Zealand) belong to the Eastern Extension Co., and work in conjunction with the land lines of the several Governments forming the Commonwealth, and those of the Dominion of New Zealand, maintaining intercommunication with all offices in Australasia and New Zealand.

A series of cables managed by the British Pacific Cable Board connect New Zealand and Australia with Canada via Norfolk, Fiji, and Fanning Islands, thus affording by means of the land line across Canada and the North Atlantic cables an additional route between Australasia, Great Britain, and Europe.

The Eastern Extension Co. also possess cables from Singapore to Cochin China, Hongkong, Manila (Philippine Islands), Macao, Sharppeak, Foochow, and Shanghai. From Cochin China land lines extend to the Kingdom of Siam and Kelantan. The Island of Labuan, off British North Borneo, is also connected by this company with a cable to Singapore on the one side and to Hongkong on the other, which with the direct cable between Singapore and Hongkong (mentioned on the previous page), makes a triplicate route between Singapore and Hongkong. A cable joins Labuan with Menumbok, on the mainland of British North Borneo Co.'s territory, from whence a land line extends to Sandakan and other offices.

Submarine cables of the world

[Corrected to December, 1925]

(1) CABLES OWNED BY GOVERNMENT ADMINISTRATIONS

Country	Length of cables in nautical miles	Country	Length of cables in nautical miles
Argentine Republic	75	Japan	7,467
Belgium	125	Mexico:	
Brazil	26	Federal Government	6
British Guiana (British)	23	Companies	2
British India and Indo-European Telegraph Department Government Administration (British)	2,339	Netherlands Indies	6,553
Canada (British)	373	New South Wales (British)	37
Ceylon and India (joint) (British)	66	New Zealand (British)	413
China	1,780	Norway	2,100
Denmark (telegraphs and telephones)	518	Portugal	139
France and Algeria	3,300	Queensland (British)	53
France (principal international and French colonial cables)	2,522	Rumania	310
(French) Dahomey and Dependencies	8	Russia in Europe and the Caucasus	930
Germany	1,940	Russia in Asia	21
Great Britain (international cables) (British)	9,062	South Australia (British)	55
Greece	245	Spain	3,547
Holland	500	Sweden	198
Pacific Cable Board System (British)	12,779	Switzerland	10
Pacific Cable Board West Indian System (British)	1,620	Tasmania	9
Italy	4,822	Tunis	4
		Turkey in Europe and Asia	365
		United States of America	4,344
		Uruguay	8
		Victoria (British)	376
		Western Australia (British)	23

(2) CABLES OWNED BY PRIVATE COMPANIES

Company	Length of cables in nautical miles	Company	Length of cables in nautical miles
African Direct Telegraph Co. (British)	2,882	Europe & Azores Telegraph Co. (British)	1,062
All-America Cables	18,462	Great Northern Telegraph Co	8,417
Amazon Telegraph Company (British)	2,480	Halifax & Bermudas Cable Co (British)	852
Canadian Pacific Railroad Co. (British)	91	Indo-European Telegraph Co. (British)	23
Commercial Cable Co	22,387	Mexican Telegraph Co	3,721
Commercial Pacific Cable Co	10,019	River Plate Telegraph Co	222
Commercial Cable Co. of Cuba	1,549	United States and Hayti Telegraph & Cable Co	1,432
Compagnie Francaise des Cables Telegraphiques	15,246	West African Telegraph Co. (British)	1,474
Compagnie des Cables Sud-Americains	3,779	West Coast of American Telegraph Co. (British)	2,039
Cuba Submarine Telegraph Co. (British)	1,482	West India & Panama Telegraph Co. (British)	4,355
Direct Spanish Telegraph Co. (British)	706	Western Telegraph Co (British)	28,985
Direct West India Cable Co. (British)	1,267	Western Union Telegraph Co	25,567
Eastern Telegraph Co. (British)	54,988	Campagnia Ital. del Cavi Telegrafici Sottomarini	
Eastern Extension, Australasia and China Telegraph Co. (British)	29,155		
Eastern & South African Telegraph Co. (British)	12,010		